amateur radio

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VHF Transequatorial Propagation

An Approach to UHF SSB

Electrical Measuring Instruments

VK-ZL-Oceania DX Contest, 1971 Results

amateur radio

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CONTENTS

COVER STORY

Does this piece of equipment look vaguely familiar? It used to be a rather battered looking transceiver of early vintage. An article describing the transformation will be published in a future issue of "A.R."

(Photo: B. A. Bunning)

QSP

"Suitable Alternative Reasonably Available"

The Executive of the W.I.A. has been working on the problem of obtaining duty free entry of items of Amateur Radio equipment. Their investigations showed that a surprisingly large number of items are manufactured in Australia, and it is therefore impossible to obtain exemption from Customs Duty (or "by-law" entry). However, the possibility of gaining by-law entry for s.s.b. transceivers appeared to remain open to us. Although numerous (and mouth-watering) models are available in the U.S.A., Japan and elsewhere, a single unit only of Australian manufacture has ever reached the local market, and the price tag for this exceeded $1,100. The stated criterion for by-law entry (re-iterated by Mr. Chipp in a speech to the House of Representatives on April 11 this year) is that "no suitable alternative is reasonably available" from Australian sources.

Mr. Chipp emphasised the importance of the four words "suitable alternative reasonably available". On this basis, the $1,100 machine clearly is not "reasonably available" to virtually all possible end-users (i.e. Radio Amateurs). Mr. Chipp stated that the "end-use" did have a bearing on the discussion as to whether by-law entry would be permitted. He illustrated the point by discussing the case of a hypothetical request for by-law entry of a concert grand piano where upright pianos only were made in Australia.

If the Bandywallop Symphony Orchestra wanted to import, duty free, a concert grand piano for their next hay-shed concert, they may well find that they have to settle for an upright. However, if a pianist of international repute wanted to import a concert grand for a major performance, a case for by-law entry may well succeed.

The moral of this story should not be lost on the Radio Amateur. However, another local manufacturer now claims to be virtually ready to supply an s.s.b. transceiver at a reasonable price and with an acceptable delivery time.

If this is so, obviously a by-law application for an s.s.b. transceiver will not succeed, but of course Australian Amateurs will have the benefit of being able to buy an Australian product, presumably designed around their particular requirements. If, on the other hand, deliveries are not forthcoming within a reasonable time, or if the price proves unreasonable, your Executive will again press the matter of by-law entry with the Customs Department.

Dr. J. R. GODING, VK3DM,
W.I.A. Executive Member.

PROJECT AUSTRALIS

N.A.S.A. news is that A-O-C will now fly with Nimbus-E weather satellite scheduled for launch in November. Further details will be given as soon as possible from the Project Australis Group.

EX-G RADIO CLUB

From various sources comes news of the "Ex-G Radio Club" extension of activities in Australasia. This club, affiliated with the R.S.G.B., was founded for Amateurs born or naturalised in the U.K. but domiciled abroad. The ex-G net operates every Sunday on 14347 kHz., plus or minus QRM, from 1900 hours Z, but in June to August only on first and third Sundays. Details may be obtained through Laurie Kelsall, VK2AKV, ex G3PO, QTHR. A local net on 80 metres is being arranged.

TOPICAL TOPIC

There was the computer which refused to work until it was given at least two circuit breaks a day. (A.R.N.S.)

RECEIVER LICENSING

The R.S.G.B. "Radio Communication" mentions a U.K. Statutory Instrument which reads, inter alia, "on and after 1st April, 1971, there is hereby exempted from the requirement of a licence the installation and use of wireless telegraphy apparatus used only for the reception of messages sent by telephony or telegraphy from licensed amateur stations provided that the apparatus shall be open to inspection and testing by an authorised person."

THOUGHT!

Success in (Morse) code transmission and reception is not measured by the brilliance or speed of the sender, but in the accurate receipt of the message. ("Break-In" April)

EQUIPMENT

Have you seen the W.I.A. tie? In blue or maroon terylene, the tie is a good buy at $2.75; from Divisions or Executive Publications. Incidentally, do you sport a W.I.A. badge? Another good buy at only 80c each—full member or associate, pin mounting on lapel.

EXAMINATIONS—G SCENE

Only 54.22 per cent. of the 1,699 candidates who took the 1971 R.A.E. managed to score a "pass". These comments in the "Short Wave Magazine" for March 1972 continued with questioning why it was one of the poorest results on record in the U.K. reflecting a decline over the past three or four years.

With the examination fee being a minimum of 30/- (say, $3.30) one would think that candidates would properly prepare themselves for the exam.

AN APPROACH TO U.H.F. S.S.B.

R. K. GRAHAM,* VK2ZQJ
(ex VK6ZDS, VK5ZSD)

● A moment's reflection at the conclusion of the 1971-72 Ross Hull Contest would have revealed to even the most sceptical diehard that s.s.b. had finally arrived on the 6 metre band. After somewhat more than a decade, s.s.b. transmissions held a most marked numerical supremacy over other modes.

S.s.b. on the other v.h.f./u.h.f. bands has, however, been a somewhat different story. The 2 metre band has always had its s.s.b. adherents and the number of stations using s.s.b. has been increasing, albeit slowly. S.s.b. transmissions on 432 MHz. and 1296 MHz., however, have never been common. A recent head count revealed not more than perhaps ten stations with 432 MHz. capability (disregarding video) and certainly not more than five stations with active thoughts of s.s.b. on 1296 MHz., let alone equipment; numbers which are small but not insignificant when considering the number of stations active on these bands.

As the state of the art capability for s.s.b. on 432 MHz. was demonstrably reached in Australia in 1963,[1] one ponders the reasons for the lack of further development of s.s.b. activity. One immediate problem was appreciation of the concept of s.s.b. transmissions on 432 MHz. and 1296 MHz., another and probably more significant problem has been the relative dearth of literature describing s.s.b. equipment for these frequencies. A search of the literature revealed the curious situation that, with the exception of a recent article in "Ham Radio,"[2] published articles have either described low power exciters or linears with kilowatt capability,[1, 3, 4] and drive requirements to match.

The equipment to be described resulted from one approach to high power s.s.b. capability on u.h.f. A few preliminary observations would be in order. Crystal oscillator stability was of paramount importance and must be given adequate consideration, v.f.o. requirements were no more demanding than current h.f. band practice dictates. The transistorised v.f.o. described in "A.R." could be recommended.[5] Forced air cooling for the QQ series tubes was desirable and essential for 4CX series. As high stage gains with linear amplifiers at u.h.f. could not be achieved, a string of linears with all the attendant problems became inevitable. At 432 MHz. the QQE03/20 and 6/40 series valves have stage gains of less than 6 dB. and the 4CX series 10-13 dB.[6, 7] 2C39, 3CX series tubes approach 6 dB. gain at 1296 MHz.[8, 9] 3CX series valves were mechanically difficult at 432 MHz. and were not considered in the work described here.

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432 MHz. S.S.B. TRANSMITTER

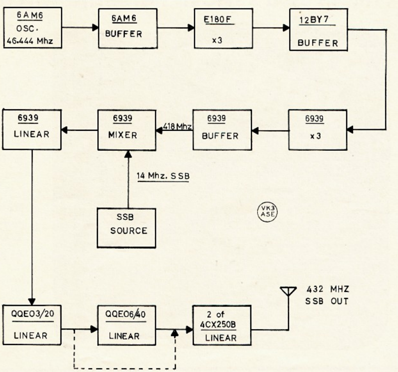
See Fig. 1. The impedance inverter oscillator[10] followed by a buffer amplifier was found to be a most stable and satisfactory circuit, the E180F was conventional and the 12BY7 or similar ensured sufficient drive to the tripler and eventually the final. See ref. 11 for circuit parameters. The mixer circuit used in the original equipment was derived from ref. 12. Both signals were fed into the control grid, the 14 MHz. s.s.b. via a push pull grid circuit and the 418 MHz. via a capacitive divider. Acceptable suppression of the 418 MHz. signal could not be achieved if injection was via the cathode. A circuit which has been claimed to give good performance with control grid injection of the mixing signal and cathode injection of the s.s.b. signal has been described in ref. 2—see also 13.

The 2/5 linear was conventional, bias was around 3v., screen regulation was not required. The 3/20 linear was confirmed as being significantly more efficient than a 6/40 for the same input.[6, 14] Bias was of the order of 20v., E_{SG} stabilised at 300v., E_P 450v., and I_P 20-100 mA., quiescent to full carrier. The grid circuit was similar to that described for a 576 MHz. transmitter,[15] the basis of the design being outlined in ref. 6. An alternative technique was described in "QST";[16] appropriate correction for the velocity factor of the cable used for the balun loop must be made. Output from the 3/20 was sufficient to drive the final to an input of the order of 250w., however the 3/20 was over run, efficiency has been claimed to be no more than 40%[6] and air cooling was desirable. The grid circuit of the 6/40 was as indicated in either ref. 15 or 16, E_P was 700v., E_{SG} stabilised at 300v., I_P 30-170 mA. The 3/20 easily drove the 6/40 into grid current. Plate circuits for the 3/20 and 6/40 were quite conventional.[11, 16]

The Final

Several articles have described the use of a pair of 4CX series valves at 432 MHz., all were essentially similar.[3, 4, 17, 18] An important point for success was the use of an electrical three-quarter wavelength grid circuit. Such a circuit was found to be significantly more efficient than the more conventional half wavelength grid circuit.[3, 18] Neutralising was not re-

FIG. 1 —— 432 MHZ SSB TRANSMITTER



quired and filament voltage was maintained at 6v.,[2,7] satisfactory only if the duty cycle was low. Output of the 6/40 was adequate to drive the final to grid current. The efficiency of the final was, however, a moot point. Figures between 40% and 55% have been claimed.[18] Correct phase drive relationship was essential[18] and individual screen current monitoring was useful.[12] However, if old tubes were used, monitoring the latter tended to confuse the issue as tubes ex commercial service under static test generally showed a wide variation in I_{SG}, given the same test parameters with similar I_P for a fixed E_G and E_{SG}.

The article by Meacham[12] details the art of setting up external anode linears.

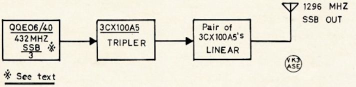
1296 MHz. S.S.B. TRANSMITTER

See Fig. 2. With the advent of varactors, tripling to 1296 from 432 MHz. has become relatively simple and the type of circuit described in the A.R.R.L. V.h.f. Manual[19] could be made in an afternoon. For the same input, an MA4060 had the same order of output (E_P 500v., plate input 50 watts), which in turn would drive the final to 220w. input, loaded grid current being of the order of 40-50 mA. Stage gain was measured at 5½ dB. and output by slide rule, in the vicinity of 50w. To drive the final to 600w. input, the absolute s.s.b. limit of the tubes,[2] would seem to require a tripler to drive a single tube straight to drive the pair.

An s.s.b. signal tripled in voice spectrum had a quite fascinating sound to it, and was for all practical purposes undemodulatable, the use of an s.s.b. spectrum divider[22, 23] would enable serious work on 1296 MHz. s.s.b. This device would, of course, permit 432 MHz. capability from a 144 MHz. s.s.b. source. The more conventional approach of mixing suitable signals to give a product on 1296 was considered but rejected for reasons outlined in ref. 24.

The only difficulty with s.s.b. on the u.h.f. bands is the association of the concept of s.s.b. with u.h.f. It has taken of the order of a decade for s.s.b. to become the dominant mode on 6 metres. If more u.h.f. exponents took serious cognisance of the tropospheric path loss-distance curves[19] or considered the possibilities of meteor scatter,[25, 26] then the conversion to s.s.b. would be just that much more rapid.

FIG 2 —— 1296 MHZ SSB TRANSMITTER



as a 3CX100A5 tripler with 20w. plate input. However, with higher drive power and plate voltages over 500v., the valve tripler was paramount. Many designs for triplers have been described.[9, 11, 20]

The pair of 3CX100A5 described in "QST" some years ago,[8] has been popular for discussion in VK, but very few, if indeed any, have been heard on air. There were several reasons for failure with this design. The original "QST" article was not particularly explicit as regards the mechanical arrangement of the anode cavity tuning, this omission was corrected in a later article in "Ham Radio".[21]

The 1296 MHz. drive requirement was high and the setting up procedure complex due to the limit on grid current. The pair of tubes could be driven to maximum grid current, 120 mA. through 50 ohms, with less than 10w. of r.f. However, when plate voltage was applied, the drive impedance appreciably increased, concommitantly the grid current would drop to around one-fifth. This effect could only be seen if separate plate and cathode current meters were used. It was necessary, therefore, to use sufficient drive to tune up the cavities and then with E_P on, increase the drive, taking care to remove drive before or simultaneously, removing plate voltage. High plate voltage was essential for success with this final and the minimum would be 750v., 1,000v. being more desirable. The 6/40 linear previously described with a carrier input of around 80w. gave sufficient output to drive a 3CX tripler[9]

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VHF TRANSEQUATORIAL PROPAGATION

PART TWO

*ROGER LENNED HARRISON,**
VK2ZTB, ex-VK3ZRY

CLASS II. TEP—CAUSES AND CHARACTERISTICS

The characteristics of Class II., or evening-type TEP, are generally well known, but the mode of propagation is not yet known or completely defined. Several different explanations have been put forward based on the correlation observed between night-time TEP observations and the occurrence of equatorial spread-F.[7, 11, 14] Experimental results, when applied to the various theories, have shown them to be incorrect, but it is well established that there is some definite connection between spread-F along the paths considered and the occurrence of Class II. TEP.[7, 10, 11, 14]

The higher frequencies propagated by Class II. TEP offer some interesting possibilities to the communicator.

There is a maximum occurrence between 2000 and 2300 LMT with a pronounced peak somewhere in this range for different seasons and particular paths. This means that just about every circuit has an individual peak occurrence time for different seasons but it will be somewhere between 2000 and 2300 LMT.

This coincides well with the occurrence of equatorial spread-F but the duration of TEP signals is usually less than the duration of spread-F.[7, 10] It has not yet been established why this is so. Class II. TEP has been observed to last until the early hours of the morning, but only rarely. The occurrence of Class II. TEP openings is greatest during the equinoxes,[7, 10–12, 14] as is spread-F—this is more pronounced than in the case of Class I. TEP. These openings are fewest during the winter solstice[7, 10, 11, 14] over the magnetic equator, which occurs during December-January for the Asian and African sectors and June-July for the Americas.[7]

Start times for openings via Class II. TEP are less dependent on path geometry than for Class I. TEP as also are the times of duration. Class II. is much more tolerant of asymmetrical path geometry than Class I.

Usually contacts are dependent on:—

(a) Appearance of equatorial spread-F at an appropriate geomagnetic latitude.

(b) Season of the year, i.e. proximity to the equinoxes.

(c) Sunspot number.

Path Characteristics

Path lengths for Class I. TEP are generally from 3,000 km. to 6,000 km.[7, 10–12, 14] and terminals are quite often asymmetrically and obliquely situated with regard to the magnetic equator.[7, 11] Some very long night-time paths have been observed,[7, 11, 16] but these can be explained by the occasional continuance of the Class I. TEP mode after sunset[11] or another mode of propagation assisting in extending the range of signals. Again, sporadic-E is likely to be the reflector at the lower end of the VHF range. Tropospheric ducting could extend the range in a similar fashion at the higher frequencies, but little work has been reported in this direction. Nielson mentions Es in this regard in his paper.[12]

You have probably noticed that the possible, and observed, ranges of the two types of TEP overlap. Thus there is a zone where stations (or circuits) will experience both modes, and zones where stations will only experience one or the other. The area between 20° and 30° geomagnetic latitudes [see Figs. 2, 3, 4 (crosshatched to the left)] is common ground for both Class I. and II. TEP. Stations located in these areas will encounter both modes from time to time with perhaps a gradual transition from Class I. to Class II. (evidenced by an increase in flutter fading after 2000 hours) or a signal dropout of up to an hour's duration.[11]

Stations north and south of about 30° geomagnetic latitude will tend to see only afternoon-type TEP while those stations closer than about 20° to the geomagnetic equator will tend to see only evening-type TEP.

The westward movement of contacts via Class II. TEP is not generally noted as it is for Class I. TEP. The irregularities that occur in the base of the F-layer, are certainly known to move westward, but their longitudinal "spread" is usually considerably wider than for the equatorial anomaly. As Class II. TEP appears to depend to a large extent on these irregularities, the westward movement may be masked by their longitudinal width and the tolerance to asymmetrical paths that is noted.[11, 14]

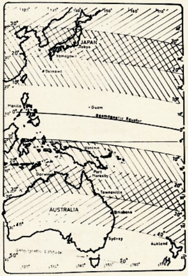

Fig. 2.—Australasian sector of the world showing terminal zones for Class I. TEP (20 deg. to 40 deg. geomagnetic latitude) and Class II. TEP (10 deg. to 30 deg. geomagnetic latitude).

Seasonal Characteristics

There is a marked dependence of Class II. TEP on the equinoxes and sunspot number. The same dependendce is noted for equatorial spread-F.[10–12, 14]

Class II. TEP has a maximum number of occurrences which lags the sunspot maximum by a year or so—as is noted for Class I.[11, 16] The reasons for this are not yet clear, but further research should elucidate the causal mechanisms.

Similarly to Class I., contacts can be had almost every night around the equinoxes[1, 2, 7, 10, 16] during peak occurrence years. There is a rapid drop off in the number of occurrences after this time, few contacts being noted during the solstices and the years spanning the sunspot minima. Observations carried out using oblique sounders and beacon transmitters also bear this out.[10, 12]

Signal Characteristics

The most surprising and exciting aspects of Class II. TEP signals are the high frequencies that it will support and the high signal strengths that are recorded.

Beacon transmissions on 102 MHz. from Darwin have been recorded in southern Japan on many occasions. but, as yet, there have been no reports of higher frequency signals. No upper frequency limit has been proposed for Class II. TEP as the mechanism by which it is reflected or refracted in the ionosphere is not yet known. Here is an opportunity for enterprising Amateurs who would like to try for some exotic DX on 144 MHz.—and make a contribution to a body of scientific knowledge on a phenomenon about which we know little. Unfortunately, 144 MHz. contacts might have to wait till the next sunspot maximum. But don't let me discourage you from trying.

Generally speaking, high signal strengths are experienced having a considerable amount of flutter. The flutter rate is mostly between 5 and 15 Hz. and a power spectral density graph shows that Doppler shift is mainly between ±40 Hz. This means that, at times, A3 (DSB or SSB) signals will be seriously degraded.[12] The effect on wideband systems (FM or PM) would be much less, but TV would suffer owing to the spread of time delays experienced.[12]

* Ionospheric Prediction Service Division of the Bureau of Meteorology, 162-166 Goulburn Street, Darlinghurst, N.S.W.

Paths whose terminals are magnetic conjugates (have the same angle of magnetic dip but the opposite sense, i.e. 25°N and 25°S) experience the higher frequencies more often and with greater reliability. The signal strength for these paths is higher than for the less favourable asymmetric paths and path lengths are generally shorter.

As Class II. TEP is probably supported in some way by field guided ionisation,[12] the closer a ray can be launched to tangency with the magnetic field, the more favourable are its characteristics, i.e. higher frequencies will be supported, higher signal strengths will be guaranteed and greater reliability will be obtained than for less favourable rays.

Many people refer to Class II. TEP as transequatorial scatter. This is quite wrong for a number of reasons. Scatter propagation involves incoherent reflection from tropospheric or ionospheric irregularities. Signal strengths are weak and have a considerable flutter component. Transmitted and received angles of elevation from the ground are much greater than for a field guided mode and signals are not necessarily received over a great circle route. Ranges for scatter propagation are much less than for Class II. TEP. It appears that the considerable flutter component often observed on evening-type TEP leads to a confusion involving the modes of propagation. Class II. TEP is dependent on many factors (season, sunspots, geomagnetic latitude, etc.) that seem to have no bearing on true scatter modes.

CURRENT RESEARCH

The Ionospheric Prediction Service Division is currently conducting research into TEP, particularly the evening-type or Class II. Equipment is being set up to examine the signal characteristics of VHF beacons located in Japan and Korea as part of this research which is aimed at elucidating the propagation mechanism of evening-type TEP and eventually predicting its occurrence. The ionosonde located at Vanimo, New Guinea, is ideally situated to study the equatorial ionosphere. It will be equipped with an interferometer system to assist in studying the irregularities that cause spread-F. It is hoped that, by September 1972, experimental short-term TEP warnings broadcast on an HF transmitter will be operative, giving 30 to 40 minute warnings of possible openings.

Fig. 3.—The American sector of the world showing terminal zones for Class I. TEP (20 deg. to 40 deg. geomagnetic latitude) and Class II. TEP (10 deg. to 30 deg. geomagnetic latitude).

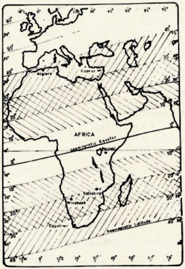

Fig. 4.—The African-Mediterranean sector of the world showing terminal zones for Class I. TEP (20 deg. to 40 deg. geomagnetic latitude) and Class II. TEP (10 deg. to 30 deg. geomagnetic latitude).

The Amateurs Can Help

Reports of TEP from Amateurs and other observers are welcome and should be sent to:—

> **Mr. Roger Harrison,**
> **Amateur Observer's Reports,**
> **Ionospheric Prediction Service Div.,**
> **162-166 Goulburn Street,**
> **Darlinghurst, N.S.W., 2010.**

Reports should contain as much of the following information as possible:—

(a) Date.
(b) Time (note whether local or GMT).
(c) Frequency or band.
(d) Signal strength.
(e) Fading characteristics.
(f) Location of your station and call sign (with location if possible) of stations heard or worked.
(g) Other observations, i.e. was sporadic-E noticed at the time; if so, to what areas? Did the signals start in one area and move to another or not? When were signals first noticed and when did they disappear?

Printed report forms for the assistance of observers can be obtained from me at the above address.

Eventually, it is hoped that TEP will be included in the normal predictions issued by I.P.S.D.

CONCLUSION

Armed with this information, and making reference to the maps in Figs. 2, 3 and 4, any keen VHF man in the right location can work some quite exotic DX.

Relatively simple equipment gives good results with TEP, most people, who have worked this mode, running less than 20 watts input. Antenna requirements are also minimal; many people using a 3 or 4 element Yagi and some only a dipole or ground-plane antenna.

Run-of-the-mill receiving set-ups involving a converter to tuneable IF or converted carphone give good results as signals are usually quite strong. AM, FM, PM, DSB, SSB, CW or FSK (RTTY) can be used with the advantage going to CW, SSB and FM or PM.

Predicting TEP on a daily basis is not yet possible, but keeping a watch on a suitably located beacon will indicate when the band is open. When the I.P.S.D. TEP warning service comes into being a powerful tool will be available to assist Amateurs (and others) in taking advantage of the existing possibilities afforded by Class II. TEP.

Suitable beacons are generally listed in various Amateur journals ("QST," "Amateur Radio," etc.) but a suitable beacon service is not available in many places. Perhaps this could be investigated by the Amateur Societies in the areas where such a service does not exist.

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(Continued on Page 15)

ELECTRICAL MEASURING INSTRUMENTS

LECTURE 15A

C. A. CULLINAN,* VK3AXU

● Continuing the series of lectures by C. A. Cullinan, VK3AXU, at Broadcast Station 3CS for students studying for a P.M.G. Radio Operator's Certificate.

It is most important that all candidates for P.M.G. Radio Operators Certificates have knowledge of the the more common electrical measuring instruments as well as some knowledge of their principles of operation.

Possibly it is for these reasons that occasionally a question about the use or construction of one or more instruments appears in the P.M.G. examination questions.

Therefore it is the purpose of this lecture to give an outline of the construction and operation of electrical measuring instruments which a candidate should know something about.

Unless stated otherwise all instruments referred to in this lecture are for use on d.c. or a.c. at power line frequencies.

Instruments making use of electronic techniques are not discussed.

* * *

Electrical measuring instruments are either indicating, graphic (recording) or integrating.

The indicating types are read directly on a scale.

The graphic types are basically those in which the normal pointer is replaced with a pen which records on a continuously moving circular chart or a paper strip so as to give a permanent record of the electrical quantity being measured at any time. The chart or paper strip may be marked in time such as seconds, minutes, hours, days, months or years, depending on the needs of the user. Sometimes this type of instrument will have a pointer and scale, in addition to the pen, so that an easy reading may be obtained at any time of the quantity being measured at that time.

Integrating instruments are strictly **meters** as they integrate an electrical quantity or power with time.

However, over the years it has become common practice to refer to just about all electrical measuring instruments as meters and to avoid confusion this term will be used in this lecture.

All electrical measuring instruments have one thing in common. The fundamental principle is that an electrical quantity to be measured is converted into mechanical motion which is calibrated in terms of that electrical quantity by means of a registering device.

This may consist of a mirror which reflects a beam of light on to a scale, a pointer which moves over a calibrated scale, a pen which draws a chart, registering dials, or numerals, in a digital display.

In this lecture we are concerned with four types of electrical measuring instruments. These are:—

(a) Current detecting or measuring instruments,
(b) Potential difference measuring instruments,
(c) Power measuring instruments,
(d) Energy measuring instruments.

These consist of instruments depending upon:—

(1) The magnetic properties of a coil carrying a current.
(2) Heating effects of currents in conductors.
(3) Induction effects.
(4) Electro-static effects.
(5) Electrolytic effects (not discussed).

Class 1 includes all types of galvanometers, electro-dynamometers, and magnetic balances.

Instruments may be classified according to their mode of operation, their method of damping, their method of control, and their standard of accuracy.

Taking these in turn we have:

Methods of Operation

Electro-magnetic:—
Moving coil instruments, polarised moving iron instruments, induction instruments, and dynamometer instruments.
Electro-thermal:—
Hot wire expansion instruments.
Thermo-E.M.F. instruments.
Thermo-bimetallic instruments.
Electro-static:—
Electro-static voltmeters.
Electro-static watt meters (not discussed).
Electrometers (not discussed).
Electro-chemical (not discussed).

Methods of Damping

Air damping, liquid damping, and eddy-current damping.

Methods of Control

Spring control, gravity control.

Standards of Accuracy

With regards to the grading of instruments the terms "precision" or "industrial" are replacing the older terms of "sub-standard", "first grade" and "second-grade".

Many current measuring instruments are concerned with the measurement or detection of very small currents, thus involving the use of instruments having the highest sensitivity. The most sensitive current measuring instruments are **galvanometers** and there is a large variety of types.

Galvanometers are used mainly in laboratories, but sometimes are found in radio stations, particularly where the staff does design and construction of equipment, therefore it has been considered desirable to include some information about galvanometers in this lecture.

D'ARSONVAL GALVANOMETER

In the simple form of this galvanometer a coil having many turns of fine wire is suspended between the poles of a permanent magnet. The suspension is of two strips or "hairs" of very fine phosphor-bronze. It is usual for this type of galvanometer to be used in the horizontal position only and the coil is held vertically, one "hair" being above the coil and the other beneath it. These "hairs" also act as the leads to the coil.

A small mirror is attached to the suspension and a light is arranged to shine on the mirror. A graduated scale is placed some distance away from the mirror, which reflects the light on to the transculent scale, usually as a spot or fine vertical line of light. If the scale is placed sufficiently far away from the mirror then a very small movement of the mirror will cause a considerable movement of the spot of light as the distance from the mirror to the scale is equivalent to a lever, it is in fact an optical lever.

The zero position of the coil is with its axis at right angles to the lines of force in the magnetic field.

Current in the coil creates a magnetic field which interacts with the field of the magnet to produce a torque or twisting action, thus causing the coil and mirror to rotate against the very small restoring torque of the suspension "hairs".

To damp the coil movement the coil may be wound on a metal former which may be of silver or copper. As the coil moves when current flows through it, currents are induced into the former by the motion and produce a torque which is proportional to velocity and opposing motion, therefore achieving a damping action. Another method of damping is to place a resistance across the instrument terminals but this reduces the sensitivity.

Galvanometers of the highest sensitivity can detect currents as small as 10^{-9} ampere.

There are a number of ways of expressing the figure of merit of a galvanometer. One of these by Prof. Ayrton, is as follows. Standard conditions, scale distance 1,000 millimetres, scale divisions 1 milli-metre long, periodic time 10 seconds, and resistance 1 ohm. Thus the figure of merit can be stated as the deflection in millimeters per micro-ampere.

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The galvanometer described above may be obtained in a variety of ranges of sensitivity and resistance of the coil.

One great use for such a galvanometer is as a null detector in a Wheatstone Bridge such as that described in Lecture No. 4. For this use the light spot is adjusted to take up a position in the centre of the scale when no current is flowing in the coil, this being the case when the bridge is exactly balanced.

It will be noticed that in the galvanometer it is the coil which moves, thus the instrument is known as a "moving-coil galvanometer.

A rather specialised form of galvanometer is that used in the motion picture industry to record sound, photographically, on motion picture film by the system known as variable area recording.

The galvanometers used are usually of the moving-iron type in which the armature causes the galvanometer mirror to vibrate through a mechanical link. These galvanometers are air-damped, are tuned to approximately 9.5 kHz. and are not critical to temperature changes. It is possible to obtain a very flat frequency response from 50 Hz. to 9.5 kHz. and many systems do much better than this. There are quite a number of varieties of this type of galvanometer.

This type of galvanometer is a refinement of the moving magnet type in which a magnet, usually a magnetised indicating pointer is deflected by a current flowing in a coil which surrounds the magnet. This type was usually employed in railway signalling work, as well as for some systems of telegraphy.

A vibration galvanometer is used for the detection of very small alternating currents. It uses light, undamped components whose natural period of vibration can be adjusted over a fairly wide frequency range.

Alternating currents of about 10^{-8} ampere at frequencies up to 2 kHz. can be detected with a vibration galvanometer.

Another type is known as a ballistic galvanometer and is used to measure a quantity of electricity rather than current.

There are some other types which should not concern us, however the **reflecting dynamometer wattmeter** may be of interest. In this instrument current is fed through the suspension to the coil which generates a magnetic field which inter acts with that of a fixed coil, the system being constructed as to be astatic. The suspension has a mirror attached to it to deflect a beam of light.

This instrument can be used to measure current or voltage as well as being a very accurate wattmeter. It can be calibrated with a.c. or d.c. and the difference will be less than 0.1%. As wattmeters some of these instruments have an accuracy of 0.05% over the range of 5 watts to 2.5 kw.

Galvanometers are usually somewhat fragile instruments and must be treated with care.

The D'Arsonval galvanometer has been described in some detail as this leads to the direct current meter which uses the basic idea of the galvanometer (a coil of wire which moves in a magnetic field) and d.c. meters are referred to as D'Arsonval types.

THE D.C. METER

The "Aerovox Research Worker," Vol. 19, No. 9, contained an exceptionally good article on the d.c. meter by the Engineering Department of the Aerovox Corporation and because of its excellence it is used here with acknowledgment to the "Aerovox Research Worker".

"Although the d.c. meter is a standard tool around the laboratory, service bench or 'ham shack,' its usefulness may be greatly enhanced by a better understanding of the principles underlying its construction and applications. Despite the fact that the judicious use of electrical instruments is an unfailing hallmark of the skilled electronics tchnician, there is a tendency on the part of many to accept the meter at its face value without ever gaining an intimate knowledge of its internal functioning. Actually a complete familiarity with the capabilities and limitations of the d.c. meter can be gained only through a study of its electrical and mechanical characteristics.

"This paper will discuss these characteristics and point out certain precautions to be observed in the use of such measuring instruments. The moving-coil, permanent-magnet type known as the D'Arsonval meter forms the basis of about 90% of the meters in common use, being used to measure current, voltage and resistance with different auxiliary circuitry.

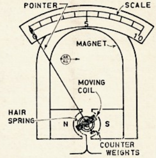


FIG. 1.

"Fig. 1 illustrates the usual form of this arrangement. The current-carrying coil is wound on a light-weight frame or armature which, in turn, is supported between sapphire-jewelled pivot bearings which allow it to rotate freely. The electrical connections to the coil are made through spiral hair-springs at each end of the armature. These fine alloy springs perform several vital functions. Besides providing the current-carrying path between the armature and the stationary parts of the meter, they provide the counter-force against which the meter torque or rotational force acts, as well as supplying the restorative force which returns the pointer to zero when current ceases to flow.

"The coil thus mounted is immersed in a strong magnetic field which is usually provided by a permanent magnet. The stability and permanency of this magnet are of importance, as well as the uniformity of the magnetic field produced between its poles. The pole tips are usually semicircular in shape to fit closely around the moving coil. The uniformity of field is greatly improved by the use of a cylindrical core of soft iron mounted in the centre of the armature so that the moving coil revolves around it. The indicating pointer is affixed to the armature at one end and a system of small adjustable counterweights is used on the tail-piece and cross arm of the pointer to balance the complete armature assembly. The angular movement of the moving coil assembly is restricted by a set of cushioned stops.

"The completed assembly is extremely delicate and precise. It is interesting to note that most of the components serve several purposes. For instance, the armature frame not only provides the form upon which the current-carrying coil is supported, but is also a closed-loop conductor in which eddy currents are induced which oppose the motion of the armature and so provide **damping** of the meter movement. Excessive overswing or oscillation of the pointer is thus avoided.

The Current Meter

"Essentially, the D'Arsonval meter is a current measuring device. The flow of current through the moving coil sets up a magnetic field around the coil which interacts with the fixed field produced by the permanent magnet to cause rotation of the coil. The turning torque developed is proportional to the strength of the permanent magnet. The number of turns in the coil, and the amount of current flowing in the coil. The pointer deflection which results is determined by the strength or counter-torque of the spiral springs. At any given meter deflection, the torque produced by the interaction of the current in the coil and the magnetic field is exactly equal to the counter-torque of the hair springs and an equilibrium results.

"Since in any given meter design the current in the coil is the only variable, the deflection of the pointer is directly proportional to the amount of current flowing. The scale graduations in properly designed d.c. meters of this type are therefore linear.

"The amount of direct current required to deflect the pointer to the highest graduation on the scale is called the **full scale sensitivity** of the meter. Instruments are manufactured in a wide range of sensitivities ranging from amperes down to a practical limit of about 20 microamperes. In addition to the above, high-sensitivity instruments are available with sensitivities of ½ microampere for full scale deflection. Such high sensitivities are achieved by the use of powerful permanent magnets, light-weight multi-turn coils, and very delicate hair-springs.

"Meters having sensitivities of one milliampere or less may be used for measuring any larger values of current by the proper use of **shunts**. If a conductor having a resistance equal to the internal resistance of the meter is connected in parallel with it, the current will divide equally between the two paths and hence twice as much

(Continued on Page 17)

An Attenuation Marker

Postscript regarding RADIATION DANGER

(by the Technical Editor)

This article by VK4AT, which was published in the April 1972 issue, has, we understand, been the subject of considerable comment, much of it critical. It is agreed that criticism is justified, not necessarily because of the unusual approach to the subject of r.f. field distribution around antennas, but because the article was both vague and undesirably long. On these grounds it would probably not have been published under normal conditions, but was accepted while the Publications Committee was being re-organised under the management of the Executive rather than the VK3 Division.

We have received a further contribution from VK4AT on the same subject. For reasons mentioned above, and with apologies to the author, it is not proposed to publish it in full. However, we feel that some results of his experience should not be ignored, in view of the danger to which some experimenters can be exposed.

Briefly summarising: while experimenting along the lines described in the April issue, using a sodium vapour street lamp rather than a fluorescent tube, VK4AT suffered quite serious radiation burns to the arm and body. The r.f. power level involved was more than the few watts previously advised. At the time of exposure there was no sensation of pain, nor was there visible ionisation in the sodium lamp. The physiological effects appeared later. They were quite painful and lasted for several weeks.

On a second occasion (the exact experimental details are not clear) radiation of a different type was experienced. Again the effects were not felt for some hours, but caused burns to the skin and to one eyeball which took months to heal, fortunately, it appears, without causing permanent damage.

The warning is clear. High field strengths, particularly when ionisation is facilitated, are **dangerous**. Power levels need not be high to produce high field strengths when high Q resonators are involved. Some forms of laser action can occur unexpectedly. If you don't know the dangers and how to avoid them, don't risk finding out the hard way!

The face behind one of the biggest signals on 160 metres. Cedric Smyth, VK3ACH, at the controls of his well-heard mobile rig.

Commercial Kinks

Many thanks to all who have written with suggestions for future editions of this column. Without a doubt the FT200 heads the list, so if all goes to plan, the August issue should see the start of a series on this piece of gear. If you have any ideas, problems, or suggestions about FT200s let me hear about it right away.

Back to the present. This month some notes on the Trio 9R 59D series receivers and also alignment data for Swan transceivers.

TRIO 9R 59D RECEIVER

This receiver has been on the market here for around four years. In that time it has progressed from the DE to the DR and the current DS. Up to date, I have been unable to find out just what the difference is between these various models. Even the local agents don't know, or won't tell if they do. A close check of the circuits reveals only one change. The b.f.o. h.t. dropping resistor R28 has been reduced from 47K ohms in the early series to 2.2K ohms in the later ones. As yet I have not had a chance to try the change in my 9R 59DE, but it could increase the b.f.o. output and perhaps improve s.s.b. and c.w. reception.

As they stand, these receivers will do quite a fair job considering their price and will make an excellent receiver for the Amateur who works on 160, 80 and 40 metres.

However, a few slight modifications are worth while. Firstly get hold of a copy of April 1969 "A.R." In this David Rosenfield, VK3ADM, described some changes to the power supply section that are worth doing. If you have no copy of this, write to me and I will be happy to forward the circuits to you. These changes will improve the power supply regulation and allow a higher r.f. gain setting on s.s.b. and c.w. reception. David stated in his article that these modifications will also produce a lower hum level. I disagree with this. Most of the hum is induced directly into the output transformer from the power transformer. The only way to cure this is to move the output transformer under the chassis. A good place to mount it is on the back of the coil box. There are enough holes already here so you need not drill any.

While on the subject of hum, I wonder how many Amateurs have invested in a pair of stereo headphones to use on their transceiver or receiver and have been disappointed with the results? Generally the first reaction is where did all the hum come from. Well, of course, it was there all the time, but now you can hear it much better. The answer, reduce the sensitivity of the phones with a series resistor of around 200 ohms. A quarter watt rating is large enough and it can be fitted inside the plug. All the hum will now have gone and you need not wind the audio gain down from the normal speaker setting.

Back to the Trio. When using the set in the s.s.b. position the a.g.c. is removed from the 6BA6 r.f. stage. Better a.g.c. action can be obtained on sideband if the set is modified to allow for a.g.c. on the r.f. stage at all times. But first there is a catch. With a.g.c. on the r.f. stage you will get a marked improvement on 160, 80 and 40, but pulling of the h.f. oscillator might occur on 20. This will give an effect of frequency variation with modulation on s.s.b. signals. If you would like to try it first remove the white connection going to the function switch. Next find the tie strip near the 6BA6 r.f. stage which carries the a.g.c. connection. This can be identified by a one megohm resistor which runs from it to the grid connection of the tube via a 47 ohm stopper resistor. Connect a short jumper lead across to the a.g.c. point on the printed circuit board.

We will leave the 9R 59D at that point but if readers are interested in more modifications, let me know, I have quite a few more.

SWAN TRANSCEIVER

Filter Alignment for Models 350, 400, 350C, 500 and 500C

My thanks to Swan Electronics and to Ted VK3TG for passing on the information.

Equipment required: r.f. watt meter, audio generator.

Schematic symbols for the normal and opposite sideband carrier oscillator trimmer capacitors as listed for the various models:

Models	350	400	350C
Normal s.b.	C1402	C1507	C1405
Opposite s.b.	(opt.)	C1506	(not avail.)

Models	500	500C
Normal sideband	C1406	C1403
Opposite sideband	C1405	C1402

Alignment, allow 15 minutes to warm up. Load the unit up on the 20 metre band as you would for normal operation. Key the p.t.t. and balance out the carrier with the carrier balance control. Feed 1500 Hertz from the audio generator into the mic. input. Adjust the gain of the audio generator and the mic. gain until the watt metre reads output. Ten or fifteen watts is sufficient. Adjust the first i.f. transformer slug with a plastic hex. alignment tool for maximum output. The first i.f. transformer is Z801.

Adjust both slugs in Z1301 (designated Z1401 in the Swan 400) for maximum power output. Increase the gain of the audio generator until the watt meter reads 80 watts output. Sweep the audio generator down to 300 Hertz. Adjust the normal sideband carrier oscillator trimmer for a reading of 20 watts. Switch the sideband selector to the opposite sideband and adjust the carrier oscillator trimmer for 20 watts output.

That's all for this month. Next issue will have information on vox units for some of the popular transceivers.

—VK3OM

V.H.F. PROPAGATION

(Continued from Page 7)

12. Nielson, D. L., "A Review of VHF Transequatorial Propagation," Stanford Research Institute (unpublished).
13. Eccles, D., and King, J. W., "A Review of Topside Sounder Studies of the Equatorial Ionosphere," Proc. I.E.E.E., 57, June 1969, page 1012.
14. McNamara, L. F., "Range-Spreading and Evening-Type Transequatorial Propagation," Physical Science, Vol. 234, Nov. 22, 1971.
15. Ratcliffe, J. A., "Sun, Earth and Radio—an Introduction to the Ionosphere and Magnetosphere," World University Library, published 1970.
16. Jamieson, E., "VHF," "Amateur Radio," January 1970 to June 1971.

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. Position in the list is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total D.X.C.C. credits given, including deleted countries. Where totals are the same, listings will be alphabetical by call sign.

Credits for new members and those whose totals have been amended are also shown.

PHONE

VK5MS	320/344	VK4VX	296/296
VK6RU	318/344	VK5AB	296/314
VK4KS	311/326	VK2APK	293/300
VK3AHO	310/326	VK4FJ	286/307
VK4UC	303/303	VK4TY	284/288
VK6MK	303/324	VK4PX	280/281

New Members:

Cert. No.	Call	Total
130	VK3JF	104/104
131	VK4LZ	110/110
132	VK3SO	104/104
133	VK3AKR	125/125

Amendments:

VK5WV	110/110	VK4NQ	124/124

C.W.

VK3AHQ	310/325	VK3NC	273/300
VK2QL	305/328	VK6RU	266/288
VK2APK	289/297	VK3YD	263/282
VK4FJ	289/315	VK4TY	259/272
VK3YL	288/305	VK3TL	254/260
VK3XB	285/300	VK3RJ	251/265

Amendments:

VK3KS	247/254	VK3LV	121/121
VK3JF	194/201		

OPEN

VK6RU	318/344	VK4VX	304/304
VK4SD	315/330	VK4UC	303/303
VK4KS	312/331	VK6MK	303/324
VK2VN	311/330	VK2EO	301/325
VK2APK	307/319	VK2SG	298/304
VK4TY	306/321	VK4FJ	297/323

New Members:

Cert. No.	Call	Total
139	VK3SO	108/108
140	VK3JF	205/212

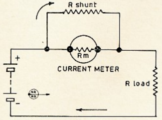
Amendments:

VK3XB	291/306	VK4NQ	136/136
VK4PX	287/292	VK3LV	126/126

MEASURING INSTRUMENTS

(Continued from Page 10)

current will be required to give full-scale deflection of the meter. If a shunt is chosen which has one-fourth the resistance of the meter coil., the currents through the parallel resistances divide in the ratio of 4 to 1, and since only **one-fifth** of the total current flows through the meter, it's full-scale indication is multiplied by a factor of five.



R shunt = $\frac{Rm}{N - 1}$

Rm = Internal meter resistance.

N = Desired scale multiplying factor.

USE OF SHUNT RESISTANCE TO EXTEND CURRENT METER RANGE

FIG.2.

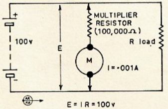
"Fig. 2 shows the connection of a shunt to a direct current meter and the equation commonly used to determine the shunt resistance required to extend the scale by a factor N. The internal resistance of the meter may be determined from the published characteristics of that type, or by measurement. In multi-range instruments, it is usual to select shunts which multiply the scale calibration by multiples of ten for ease in reading.

The D.C. Voltmeter

"The same basic movement which is used to measure direct current is also employed in voltmeters. In this case, resistance is added in **series** with the meter in the manner shown in Fig. 3. Such external **multiplier resistors** may be used with a high sensitivity milliameter or microameter to measure voltages ranging from millivolts to kilovolts. The meter is still performing its original function as a current measuring instrument, but in this case it is measuring the current which an unknown voltage causes to flow in a known resistance. The voltage is therefore determined by Ohm's Law (E = IR) and the meter scale may be calibrated directly in terms of voltage.

"Meters for voltmeter applications are classified according to 'ohms-per-volt' ratings, i.e. the number of ohms which much be contained in the voltmeter circuit for each volt which the meter is to indicate. For example, to limit a voltmeter using a one-milliampere basic movement to full scale deflection when 10 volts is impressed, the total resistance of the circuit must equal 10,000 ohms, by Ohm's Law. A total of 15,000 ohms would be required for 15 volts full scale, etc. Thus a 0.001 ampere meter, one milliampere full scale, is rated at '1,000 ohms-per-volt'.

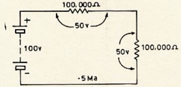
"The same meter can be made to read 500 volts full scale by using a 500,000 ohm multiplier in series with it. In such cases, where the required multiplier resistance is very large compared with the internal meter resistance, the latter is usually ignored since the error introduced is much less than the reading accuracy of the meter. However, if it were desired to make a 1,000 ohms-per-volt meter read 1 volt full scale, it would be necessary to include the meter resistance in the total value of 1,000 ohms required. If the internal resistance of the meter is 100 ohms, the correct value of the multiplier would be 900 ohms since a 10% error would be introduced if the meter resistance was neglected.



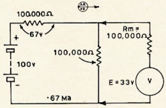
E = IR = 100v

USE OF D.C. METER AS VOLTMETER

FIG. 3.



UNDISTURBED CIRCUIT CONDITIONS



CIRCUIT "LOADED" BY VOLTMETER

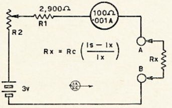
FIG.4.

"Since the voltmeter is always connected across the voltage drop being measured, it is important to use an instrument having a total resistance which is large compared to the circuit to which it is connected. Otherwise serious inaccuracies result since a low resistance meter 'loads' the circuit being measured so that the voltage drops indicated are not those which exist in the undisturbed circuit. A simplified example of such misuse of the voltmeter is illustrated in Fig. 4. To reduce such errors, basic meters having full-scale sensitivities of 50 microamperes (20,000 ohms-volt) or 100 microamperes (10,000 ohms-volt) are used in high quality voltmeters.

The Ohmmeter

"Just as the D'Arsonval current meter is used to determine voltage when the current and resistance are known, it may be used equally well to read resistance by indicating the current which flows when a known voltage is impressed across an unknown value of resistance.

"Such an instrument, calibrated directly in ohms, is called an 'ohmmeter' and is widely used in a variety of circuit types of which Fig. 5 is a typical example. In this circuit, a battery or other source of voltage is provided which is capable of producing a full-scale deflection on the meter when the test terminals (A and B in Fig. 5) are shorted. Variations in battery voltage and other circuit constants are compensated for by adjustment of a rheostat (R2).



Rx = Unknown Res.

Rc = Circuit res.(A & B shorted)

Is = Meter current (A & B shorted)

Ix = Meter current (Rx in circuit)

TYPICAL OHMMETER CIRCUIT

FIG.5.

"If an unknown resistance is inserted between the test terminals, the meter deflection will be reduced proportionately. The meter scale can, therefore, be calibrated directly in terms of the external resistance required to limit the meter current to that value. When the unknown resistance is equal to the internal resistance of the ohmmeter circuit, the meter will read half-scale. The formula used for the calibration of this simple ohmmeter type is also shown in Fig. 5. For the measurement of extremely low or high value of resistance, more complex ohmmeter circuits are employed.

Meter Accuracy

"Meters rated at better than 1% accuracy fall into the 'prevision laboratory' category and should be used only only in protected, 'well behaved' circuits **requiring** such high accuracy. They are usually of the 'portable' type which are used with the needle in a horizontal position for greater accuracy and have mirror-scales to reduce **parallax** errors in reading.

"In the accuracy range below 1% are the great majority of 'general utility' or 'panel' meters which are the 'work horses' of the electrical instrument family. They are usually mounted in test equipment panels and switchboards in a vertical position. The average accuracy of this class of meter is about 2%.

"The accuracy rating of all d.c. meter types is usually given in terms of the percentage of full-scale reading to which the meter is guaranteed. An angle range meter reading 100 volts full scale and rated at 1% accuracy would thus read within 1 volt of the correct value at any deflection. At 10 volts this meter could, therefore, be in error by as much as 1 volt, or 10%. Good engineering practice dictates that meters be used at a minimum of one-third full-scale deflection for this and other reasons.

(to be continued)

VK-ZL-OCEANIA DX CONTEST, 1971 RESULTS

AUSTRALIA

Phone Section

Call Sign	80	40	20	15	10	Total
VK1BC	470	1380	400	950		6800
1AOP	215		3270	365		3850
1GB			3070			3070
VK2APK	1020	3695	9480	4240	55	18490
2XT	235	615	11220	3025	285	15380
2EB			3480			5570
2ABC			5570			3480
2RX		185	808	705		1740
2CM			1550			1550
2BAZ	225		620	385	200	1430
2AFA			1030	165		1195
VK3SM	400	190	2735	160		3485
3ARY			1990			1990
3QV			1440			1440
VK4LT	475	210	8885	2080	3235	14885
4VX			12235			12235
4SF			6420			6420
4PJ	345		3190	1490	1255	6280
4RF	275		3085	290		3650
4XY			3325			3325
4AK			2920			2920
4XJ		55	1330	2525		3570
4QA		1045		245		1630
VK5BW	335	720	7400	490		8945
5NO			4480	1765		6245
5SW						3690
5WV			3465			3465
VK6CT	910	4240	7690	6345	3840	23025
6HD				11755		11755
6TU			375			375
6NA				250		250
VK7GK	1515	1805	10300	2175		15795
7JV		1935	4295			6230
7KH			1055			1055
VK9GN	380	1395	12225	7080	4020	25200
(includes 100 pts. on 160 mx)						
9RY				6630		6630
9LV	535	220	4500	1070		6325
9KS			6265			6265

C.w. Section

Call Sign	80	40	20	15	10	Total
VK1AOP	515	635	1425	480		2540
VK2APK		4390	8400	4825	1075	19205
2BRK		4970				4970
2GR	530	895	1035			2460
VK3KX	380	2090	5395	3590	925	12380
3MR			10010			10010
3OP	1565	4930				6550
(includes 55 pts. on 160 mx)						
3FC	65	390	550	300	55	1300
VK4VX			8835			8835
4KX	680	265	1330	3735	1455	7465
4RF	735	510	1785	1250		4280
4AK			2050			2050
4KI			1730			1730
4XY				1260		1260
VK5NO			3565	4645	980	9190
VK6HD	2475	5365	8315	7365	4105	27625
6CT	1705					1705
VK7GK	1150	3715	7800	2630	565	15860
7LJ		390	1405			2030
7RY		475		55		960
VK8HA		165	1800			1965
VK9HL		3855	3795	3486	275	7550
9GN						3855

NEW ZEALAND

Phone Section

Call Sign	80	40	20	15	10	Total
ZL1AGO	1730	2250	8430	4610	1245	18465
(includes 200 pts. on 160 mx)						
1BKX	570	1360	8980	4545	2680	18335
(includes 200 pts. on 160 mx)						
1AMN	1320	165	7595	4125	885	14520
(includes 430 pts. on 160 mx)						
1AVO			13345			13345
1AKY	165		4815	4465	1300	10800
(includes 55 pts. on 160 mx)						
1AIZ	1190	1385	4980	2260	900	10715
1AAS			8165			8165
1AMM			4545	3075		7620
1BHQ	1360					1360
ZL2GJ	275	600	4085			4960
2AWH	2885					2885
ZL3NS			9300			9300
3RK		1885	3310	540		5735
3ABC			1590			1590
ZL4MY			2280			2280

C.w. Section

Call Sign	80	40	20	15	10	Total
ZL1BN	1065	3135	4500	1350		10050
1AFW	1065	1025	3665	1770	480	8005
1AIZ	730	2250	2815	1535	165	7495
1AMO		7065				7065
1BDN			6395			6395
1AMM		965	3860	13750		6200
1ARV			5150	300		5450
1BHQ	1580					1580
ZL2ON	55	2520	6370	1590		10535
2CD	1025	2350	5190	1790		10355
2AWH	1650					1650
ZL3GQ	2115	4805	6805	3140		16865
3IS						4100
3ABC	480	160	870			1510
3CP			785			785
ZL4FX	1170	3285	6570	1170		12195
4AT			5595			5595
4BO		4910				4910

AUSTRALIAN AND N.Z. LISTENERS

	Phone	C.w.
L2949	Log not Scored	
L3042		3965
L4104	7150	
L5112	3355	
L6112	3845	
ZL149	9476	

OVERSEAS

* Multi-operator stations.

Phone Section

Japanese Phone

JH1ARJ	10745	JA5DDF	1030
JA1ADN	7644	JA6EFT	161
JH1UDO	3048	JA6CRA	10
JA1KVT	1776	JA7MA	4698
JA1SKE	1155	JA7AD	4439
JA1CRW	852	*JA7YFY	888
JH1CJC	460	JA7FC	682
JA1BUI	352	JA7KXD	638
JA1ILN	240	*JA7YOJ	248
JA1MYW	72	JA7GAX	30
JR1THE	58	JA7KTY	72
JR1CIJ	30	JA7HYS	9
JA2IYJ	10912	JA8ARA	3894
JA2KLT	4970	JA8BXD	2080
JA2HGA	420	JA8DIV	580
JH2AKH	140	JA8SW	560
JH2DBQ	5	JA8FDB	92
JA3AAW	5635	*JA8YCO	24
JA3MVI	2688	JA9AG	10656
JA3FD	114	JA9BKW	45
JH3CRT	104	JA0BBB	1272
JA3OGE	100	JA0DOK	550
JH3ACC	60	JA0HXH	70
JA3XYC	28	JA0FMB	60
JA4BEX	8073	JA0KOH	30
JA4ERX	390		

European Phone

DL8NU	10660	OH3NJ	176
DL8PC	2340	OH2BME	12
DK3SE	1800	OH6RH	8
DJ4KD	1328	OH7OV	8
DL7PR	825	OH1XA	2
DM2AYK	561	OK1MPP	2480
DM4SPL	24	OK3MM	800
EA3JL	24	OK1MGM	84
F9RM	1056	ON5KL	1408
F6API	80	OZ1LO	2412
G3SSO	4225	OZ4IA	126
G8WS	814	OZ4PM	50
G2DC	520	OZ3PO	18
G6XL	468	OZ7BQ	15
HA5KDQ	1730	PA0JMH	174
LA5QK	156	SM0ATN	324
LA9OI	140	SM3BUS	130
OH2BO	4997	SM7ABL	48
OH2BBR	3544	SM6CDG	12
OH2SX	1164	SP3DOI	3078
OH3WF	1030	YU1SJ	1155

North and South American Phone

K0QHD	414	WB6JOD	2176
W2FCR	1598	W6DQX	1168
W3GM	6090	W7NQ	897
W3TV	2730	KG4EQ	312
W3YHR	369	PY4AP	936
W4ORT	4776	PY3APH	698
K5SNI/4	1368	*VE7VP	998
W4WSF	630	VE3GCO	639
K5MDX	7807	VE6AYU	217
K5LVZ	80	XE1LLS	1794
W6HX	13431	YV5CK	1030
W6DGH	2562	YV1ACI/5	576

U.S.S.R. Phone

European S.S.R.

UA1CS	2338
*UK6LAZ	1968
UA4CZ	1632
UW1AR	913
UA4RZ	876
UW6LC	550
UA4QM	450
UA3GM	340
*UK3YAB	336
UK4WAB	108

Asiatic S.S.R.

UW9AF	5150
*UA9IF	1276
UA0MI	1068
UW0IQ	715
UA9FU	306
UA0ABC	270
UA9MT	182
UA0DG	108

Kaliningrad

*UK2FAD	70

Byelorussia

*UK2WAF	767

Turkoman

UH8BO	252

Kirghiz

UM8FZ	1892

Moldavia

UO5BZ	96

Lithuania

*UK2BBB	7400

Latvia

UQ2HO	140

World-Wide Phone

CR7FR	150	OD5BA	196
EQ2BQ	3990	VS9MF	370
FM7AJ	296	PY3APH	8
HI8LC	72	YJ8BL	23200
HS1ACH	1638		

Oceania Phone

KH6RS	65231	KH6IJ	10140
KG6ALY	24310	KR6AY	1938
KH6GMP	19560	9V1QJ	1030
KG6JAR	14120	VR1AA	29274

Overseas S.w.l. Section

Phone

BRS26431	4420	JA4-6600	570
BRS32525	3192	JA4-4665	538
DM3501/L	360	LA-M5605	279
DM-EA5323/M	160	LZ-2K36	18
DM2703/A	140	NL-455	40
DM4835/O	140	OK1-18197	5
DM4939/B	48	OK1-15835	20
I3-13395	1786	ONL-1090	1090
I1-12387	168	ONL-383	396
JA01320/1	4218	OZ-DR1529	2048
JA1-4876	3036	UB5-073-389	5360
JA1-13603	1079	UL7-0238	1378
JA1-7777	580	UA9-158-8	1020
JA1-11166	558	UA3-123-118	510
JA8-2108/1	16	UA4-09543	144
JA3-7604	70	W3-12836	504

C.w. Section

Japanese C.w.

JA1KVT	8930	JA3AAW	2975
JA1ILN	7524	JA3DXD	626
JA1ADN	7030	JA4BJO	11914
JA1NPV	6734	JA4BEX	7200
JA1FGB	5313	JA4DZ	6
JA1SR	4480	JA5DQN	342
JA1JKG	4339	JA4AQR/5	45
JH1AWI	2828	JA5MG	36
JA1AFF	2047	JA6FFV	387
JE1CTM	1040	JA6EHG	144
JA1KNZ	572	JA7MJ	5511
JH1BYL	234	JA7FC	5115
JA1QGT	78	JA7AD	3822
JH1HTK	72	*JA7YFY	1691
JA2LA	3675	JA7BVA	884
JA2TH	3588	JA7KXD	630
JA2DNA	2736	JA7GAX	416
JA2MYA	960	JA7JQG	261
JA2HGA	612	JA8GR	18
*JA3YAW	6368	JA9YBA	11280
JA3KM	4185	*JA9CWJ	342

European C.w.

DL8NU	4452	OH5UX	2024
DM2BJD	3354	OH3MK	193
DJ4KD	1938	OH3MF	192
DM4YEL	1617	OH7NW	70
DL7NS	320	OH3NZ	60
DM3UE	84	OH7OV	8
DM2BVE	40	OH2BME	2
DM3SUH	18	OK1KOK	3068
DM2ATL	12	OM0BOB	1491
DM5SDL	12	OK2QX	976
DM2AOL	10	OK3MM	854
F9YZ	324	OK1MGW	370
F8TC	288	OK2BBJ	360
F6API	48	OM0BCI	70
G5RP	1520	OK1KYS	50
G2DC	1224	OK1KZ	48
HA5KFZ	1560	OK2BBI	40
LZ1SS	410	OM0BDE	40
LZ1AG	200	OK3AS	30
LZ2EE	216	OK2BGR	14

European C.w. (continued)

OK1MSP	6	SM0BYG	780
OK1AQW	2	SM6ARH	288
ON4XG	418	SP9EFP	1660
OZ1LO	3960	SP3DOI	1168
OZ4PM	975	SP9ABE	812
OZ1W	560	SP8HR	40
OZ3PO	252	SP6DMJ	36
OZ2X	180	SP3AUZ	12
OZ7BQ	40	SP5ATO	12
OZ5ME	2	YO7DL	594
PA0VB	96	YO2QY	418
PA0JMH	56	*YU1EXY	418
		YU1NOL	189

North and South American C.w.

W1EVT	4530	W6DQX	1600
W2LWI	2852	K6SDR	1547
W3GM	4676	*W6DGH	945
W3TV	144	WB6JOD	825
W4ORT	2496	W6MAR	814
WB4SPK	256	W6RGG	217
W4WSF	27	K6TG	60
KS5TFG	1980	W7NQ	162
W5OB	1159	W8KIT	2208
WA6EPQ	16176	W8VSK	825
W3NU/6	9844	W9JA	1323
K6QZ	8246	PZ1AH	440
K6OC	3756	YV5CKR	702

Oceania C.w.

KH6RS	52272	KG6JAR	9944
KH6IJ	10180	KR6AY	8510
		VR1AA	24381

World-Wide C.w.

CT2AZ	2	VU2UR	2
PY4AP	936		

U.S.S.R. C.w.

European S.S.R.		Ukraine	
UA1DZ	5220	*UK5WAZ	1305
*UK6LAZ	4032	*UK5IAZ	590
*UK1AAA	2664	UY5OQ	243
*UK4WAB	870	*UK5MAG	182
UW1CX	852	UB5VAA	133
UW6LC	624	UB5TQ	126
*UK3YAB	611	UB5OE	112
UA4HC	540	UB5VK	32
UV3TA	363	**Byelorussia**	
UW3HV	210	*UK2WAF	1078
UA4WAE	198	UC2WP	280
UW3EH	171	UC2XX	90
UA3AAE	160	UC2WJ	48
*UK4CAA	120	**Azerbaijan**	
UA3RH	114	UD6CN	372
UA4PU	100	UD6AM	286
UA3VA	84	UD6AS	40
UA3RJ	56	**Georgia**	
UA3TA	18	UF6QAB	144
Asiatic S.S.R.		**Armenia**	
UA0FBA	5220	UG6JJ	140
UA0ZS	2770	**Turkoman**	
UW9PT	2070	UH8BO	840
UA0ZI	1919	**Uzbek**	
UA0CAV	1818	UI8OJ	65
UW9WL	1548	**Tadzhik**	
*UK9CAE	792	UJ8AB	120
UV9CU	693	**Kazakh**	
UA0OOO	638	UL7GW	704
UA9NN	616	*UK7GAA	540
UW9AT	380	UL7CH	168
UA0LJ	360	UL7TA	119
UK9HAC	360	UL7CT	2
UA9MEW	240	**Kirghiz**	
UA9TS	160	UM8FZ	990
UA0ABC	90	**Moldovia**	
UA0CAX	72	UO5AP	44
UA0LL	54	**Lithuania**	
Kaliningrad		UK2BBB	2080
UK2FAP	720	UP2BV	315

CHECK LOGS

DM2CCM	OH1XX	SP3CDQ	UA3FF
DM3XUE	OK1AII	SP5ARN	UA3OG
JA5FTP	OZ3Q	SP5BSV	UW4NH
K4PR	SM5CVC	SP6DXB	ZL2AI

Overseas S.w.l. Section

BRS6604	40	JA4-4665	90
DM2968/L	704	JA7-3147	660
DM2703/A	108	LZ2A123	120
HE9EVI	560	W3, M. Caditz	4775
JA2-1885	624		

OVERSEAS POINTS/MULTIPLIER SUMMARY

PHONE—	80 mx	40 mx	20 mx	15 mx	10 mx	Totals		Points
KH6GMP	5/1	8/1	361/11	604/7	—	978/20	equals	19560
JA1ARJ	—	5/2	177/13	106/12	19/8	307/35	equals	10745
JA2IYJ	—	15/2	231/14	80/9	26/3	352/31	equals	10912
DL8NU	—	2/1	13/5	350/13	45/7	410/26	equals	10660
W6HX	12/3	48/8	159/12	125/11	23/3	363/37	equals	13431
VR1AA	59/8	65/8	395/13	105/9	73/4	697/42	equals	29274
YJ8BL	68/9	65/11	352/12	94/8	—	580/40	equals	23200

C.W.—	80 mx	40 mx	20 mx	15 mx	10 mx	Totals		Points
KH6RS	81/9	300/10	303/13	327/10	78/6	1089/48	equals	52272
JA4BJO	21/7	38/10	125/12	62/12	13/5	259/46	equals	11914
DL8NU	2/1	24/8	111/12	20/6	2/1	159/28	equals	4452
WA6EPQ	25/6	71/9	26/8	29/7	—	151/30	equals	4530
UA1DZ	6/2	36/9	108/11	22/7	2/1	174/30	equals	5220
VR1AA	61/9	89/10	172/10	204/10	41/4	567/43	equals	24381

Coming Round the Bend

(The abbreviations in this poem are the customary telegraphic contractions used to save time, when working.)

I well remember Charlie Teede,
Who used to work the races;
No need, indeed, to ask for speed,
He'd pace it with the pacers.
Lord help the man who "broke" him once
Or questioned his "creations";
On him a flood of scorn was turned,
The atmosphere with brimstone burned,
And Pitman, green with envy, squirmed
At his abbreviations.

"Te field got wl awa to ti
& as ty settld dwn
Te Shicer 1st t bk te li
ws flwd bi Jo Brown.
In close proxim. ws Tired Tim,
Tn cme Arbtratn,
Bhnd te bunch ws Cntr Lunch,
Gd Luck and Hi Taxatn.
Ty whizzed alng (and so did Charles)
Wthout te least cessatn.

"C r t b te topwt jumped
& got on trms wi Shicr,
Wo tn & tre hs bundl dumpd
Wh labld him a twicer."
I scrambled after Charlie
Like a trailer round a bend,
Then gave OK—but queried:
" 'C R T B' u send.
Now what is that in aid of?
Enlarge a bit my friend."

The sounder nearly hit the roof
As Charlie scorched the line.
"U ort t be on te rabtproof
Or up at Doodlekine.
Chasin poddies rnd te yd
Shd b ur chf pastime.
T tnk u cndt wrk tt out
It nrly mkes me sik,
Ani ole gin or rousabt
Cd write it wi a stik.

Fanci a man wo calls hmslf
A tgst askg tt!
A record O S vacuum
Is located neath ur hat.
D'u want it in oils bi Lambert?
Or carvd on a marbl stone?
Ole "Winja" Mortill cd tke it
& ud nvr hr a moan;
Not spelt out li Ive dun fr u
By cut dwn t te bone.

"Wl I mst sa its te bst dspla
Of ignrce Ive hrd,
O all te sqrtrs in W A
Ur crtnli te "bird"
& ani hrsh remks Ive mist
Ty all cn b inferd
'C R T B'—its knwn bi rote,
Wt wd u ha me snd?
Its cmg rnd te bnd—u goat
COMING ROUND THE BEND!"

(Origin unknown, submitted by VK2ACV.)

1972 ROSS HULL VHF CONTEST RESULTS

Due to an error, VK7KJ was shown under Section (b), whereas he should have been listed under Section (a).

☆

OVERSEAS MAGAZINE ABSTRACTS

"73 MAGAZINE"—FEB. 1972

Tuning Mr. Morse's Key; A Solid State High Frequency Regenerative Receiver; Headsets and Ham Radio; The Perfect CW Signal; Tips for Raising Your Code Speed to 20 w.p.m.; Why Not Try QRP?; VHF Dummy Load Wattmeter; An Experimental Sweep Oscillator; Who Can't Learn the Code?; The Greater Dipper; CW DX on ½ Watt; 20-60w. 1-4 Band Tx; A Look at Oscillator Kits; The Saga of Mikes and Earphones; Quick and Easy PNP/NPN Transistor Sorter; Self Contained Reflected Power and CW Monitor; Using and Improving the TEN-TEC Transceiver Modules.

"VHF COMMUNICATIONS"—FEB. 1972

Portable SSB Transceiver 144 MHz. with FM Attachment, Part 1, Circuit Description and Specification; Calculations for a Linear VFO; A Digital Calibration-Spectrum Generator, Part 2, 1.001 MHz. Accessory and Power Supply; Modifying a 27 MHz. Walky-Talky to 2 Mx; An Integrated AF-Amplifier and Voltage Stabiliser; A 9 MHz. IF-Module for Frequency Modulation; Transistorised Linear Amplifier for 2 Metres; Circulators and Isolators; Index to Volume 3 (1971).

"CQ MAGAZINE"

February.—Putting the Heath HW-17 and HW-17A on Two Metres FM; New Transformers for Old; FM STO Oscillators; Quicker and Better Low-Pass Filter Design; Twin Bisecting Loop Antenna.

March.—Antenna Basics; The K7GCO DXer 20 Metre Vertical; Improved 20 Metre Performance from the EICO; 753 Transceiver; FM Repeater Directory; Tips for Increasing CW Copying Speed; Crystal-Stable Tunability in Two Metre Mobile.

April.—A Converter for 225 MHz. FM; Riding on a Moon Beam; Inexpensive Antenna Tuner Coils; Designing Phased Vertical Arrays; Do-It-Yourself Operating Desk; FM Marker Generator, Timer, 220 Plan.

"QST"—FEB. 1972

The Crud-O-Ject; Some Notes on a 7 MHz. Linear-Loaded Quad; High Frequency Atmospheric Noise; Measuring Phone Patch Levels Accurately; Hybrid Quacker Box; The VE-2HN Digital CQer using Nand Logic; An Experimental Receiver for 75 Metre DX Work; Reviews of the Antec Universal Transmatch Model UT-1, and Heath Model IB-102 Frequency Scaler.

"BREAK-IN"—MARCH 1972

History of Manawatu Branch; Film Review, A Ham's Wide World; A Two Metre FM Transmitter; A 144 MHz. Converter; AGC for the Swan 260; Two-Band Single Support Mobile Aerial; A Simple 432 MHz. Tripler; A 432 MHz. Head Pre-Amp.; A 432 MHz. Crystal Locked Converter; Radio Society Members Provide Vital Link in Probing Atmosphere.

"SHORT WAVE MAGAZINE"

January.—Design for a Three-Band CW Transmitter; Digital AFSK Oscillator; The RF Ammeter and Radiated Power.

February.—Going VHF/MM; RTTY Converter Considerations; Regulated Power Supply Unit for Bench Work; Electronic Morse Code Generators, Part IV.

"RADIO COMMUNICATION"

February.—Some Thoughts on Mixer-type VFOs for the 2 Metre Band; the TAD100 as a Tuneable IF System; 160 Metres with the FT-101; RFI Forum; A Chipper Filter for Transistorised Exciters.

March.—A Mixer for 70 MHz.; Curing Interference to Relay TV; A Multi-vibrator IF Sweep Generator; 160 Metres with the FT-101; Portable Operation with Ground Planes.

—VK3ASC.

VHF

Contributing Editor: ERIC JAMIESON, VK5LP,
Forreston, South Australia, 5233.
Closing date for copy 30th of month.
Times: E.A.S.T.

AMATEUR BAND BEACONS

VK0	53.100	VK0MA, Mawson.
	53.200	VK0GR, Casey.
VK3	144.700	VK3VE, Vermont.
	144.925	VK3ZQC, Moe South.
VK4	52.400	VK4WI/2, Townsville.
	144.390	VK4WI/R1, Toowoomba.
VK5	53.000	VK5VF, Mt. Lofty.
	144.800	VK5VF, Mt. Lofty.
VK6	52.300	VK6VF, Bickley.
	52.900	VK6TS, Carnarvon.
	52.950	VK6VE, Mt. Barker.
	144.500	VK6VE, Mt. Barker.
	145.010	VK6VF, Bickley.
VK7	144.900	VK7VF, Devonport.
VK8	52.200	VK8VF, Darwin.
ZL1	145.100	ZL1VHF, Auckland.
ZL2	145.200	ZL2VHF, Wellington.
	145.250	ZL2VHP, Palmerston North.
	431.850	ZL2VHP, Palmerston North.
ZL3	145.300	ZL3VHF, Christchurch.
ZL4	145.400	ZL4VHF, Dunedin.
JA	52.500	JA1IGY, Japan.
HL	50.100	HL9WI, South Korea.

Some alterations and additions to the beacon list this month. Firstly, a frequency change for VK6VF at Bickley from 52.006 to 52.300. This change will be helpful as the area around the former frequency becomes very congested during DX openings, and should strong signals be emanating from the Eastern States, then the beacon could well be smothered for some time. I also received a letter from Selwyn ZL2TGT advising of the installation of two new beacons at Palmerston North, each with the call sign of ZL2VHP. The 144 MHz. final runs 6 watts output from a QQE03/20, while the 432 MHz. beacon runs 3 watts output from a QQE06/40. The antenna in each case is a turnstile, and keying 1 kHz. f.s.k. The present site of the beacons is temporary and is 50 feet a.s.l. Shut down of the beacons is automatic if the power output drops or the keying fails. Selwyn goes on to mention he believes their 432 MHz. beacon to be the first in operation in Australasia. If this applies to unattended operation this is probably correct. However, VK6 operated a beacon on 435 MHz. as required for some years, and an experimental beacon was tried in VK5 some years ago also on that band, so they have been tried before.

Selwyn also is looking for any VKs who are prepared to correspond with him re the coming launch of AOC (Oscar 6) 144-28 MHz., to exchange ideas and possibly arrange for some skeds through the instrument. If you are interested write to Selwyn Cathcart, ZL2TGT, 406 Featherston St., Palmerston North, N.Z.

HIGH POWER 144 MHz. FROM VK4

Very pleased to hear from Malcolm VK4ZEL recently and to learn he has just finished a new 4CX250B p.a. for use on 144 MHz. and plans to run the legal limit on 144 MHz. into a 20 element beam at present under construction! He is interested in operating skeds to the Southern States. Finds it difficult, because of work, to be available at night during the week, but should be okay week-ends. Available most mornings between 0800 and 1000. He is also looking to create some activity north of Brisbane to places such as Bundaberg and Maryborough, about 160 air miles. Modes of operation for the present will be a.m. and n.b.f.m., but construction is soon to start on s.s.b. gear for 6 and 2 metres.

The news contained in the above paragraph certainly will be welcome in the southern States, particularly VK5. There seems every prospect for improvement in propagation for the next few years, permitting long distance tropo contacts on 144 MHz. and we have been looking for someone in VK4 to set the ball rolling. So when the DX pounds through next year on 6, remember to keep an ear on 2, Malcolm may be there. However, despite all this, he is still very keen to work any VK4 country stations on 2 metres, and would welcome skeds.

Other points from Malcolm's letter indicate that 6 metres opened every day to VK7ZGJ from 24/12/71 to 15/1/72. Good openings to VK6 on 26/11. ZL1AVZ also worked. JA DX started in Brisbane about 3/3/72 for two hours from 1230. During week days some JAs worked, mostly by VK4ZHW mobile and John VK4ZJB from his favourite hill top. Best opening 23/3 with JAs working VK2, 3, 4, 5 and 6. An interesting point from his letter is that quite a few Amateurs are constructing equipment for tuneable use on 2 and 6 metres, with a corresponding drop in interest from Channel B and an upsurge on 52.525 MHz. f.m. Thanks for your letter Malcolm, good to hear something from VK4, please write again and assure all the southerners you will really be there when 2 metres opens up next December!

NEWS FROM PORT MORESBY

Nice letter from Rex VK9ZAP this month with news from a little heard area, VK9. Rex advises he has his s.s.b. gear working, is running about 300w. p.e.p. output to a 6 element yagi on 52 MHz., using an FT101 and home-brew transverter. On 22/3 he worked Bob C21AA in Nauru and KH6HK in the Marshall Islands. C21AA operates transceive s.s.b., v.f.o. controlled with a Drake TR6. Bill KH6HK operates a.m. on 51.997 and tunes our band for contacts. The same day, Rex worked VK8ZCJ in Darwin. On 26/3 five JA stations worked and VK8VF beacon heard. All openings occurred around 2100 (Interesting—VK-5LP). Channel 0 from Melbourne and Brisbane were being heard regularly from mid-December and still being heard every second or third night even in April with signals varying from 3 to 9 plus.

Rex advises a second active 6 metre station there now in Peter VK9ZMN, running 5w. a.m., while David VK9AH will soon be on the band also with low power. Rex's main calling frequency is 52.010 and he leaves the receiver running on that frequency. He is also interested in the possibility of establishing a beacon in Port Moresby, and carrying out some investigations.

T.E.P. REPORT

Ross VK4RO summarises trans-equatorial propagation reception this year from his location as follows: After a very good summer DX season on 6 metres, T.E.P. was not expected at all. So far it has been better than the 1970 season and from VK2 reports this is confirmed. The first JA was contacted on 20th February with 5 x 5 signals, and JAs have been heard on 6 metres on most days since. Contacts were made to VK2 (Sydney area) on 19th and 26th March around 1200, and to VK5 on 9th at 1930.

On 22nd March, Bob C21AA on Nauru was contacted at 2105 at 5 x 8 s.s.b. He had just contacted Rex VK9ZAP, and he later worked other VK4s. At 2220 on the same day, Bill KH6HK on Marshall Is. was worked 5 x 9 a.m., after he had contacted many VK4s south of here (Ayr). He reported hearing the c.w. beacon VK8VF on 52.195 MHz. 5 x 9 during the evening. Later at 2240 C21AA and KH6HK heard working each other on c.w. During these contacts the JAs were still there, and the next day they reported hearing VK4 signals at 0030.

The band openings here have been observed as follows: 50 MHz. a.m. (50.2 and 50.3 a.m. nets) heard first around 1300 to 1400. 50.5 MHz. JA1IGY carrier only 9 (trouble with keyer)—from about 1400 until about 1700 to 1900 with slow QSB, sometimes quite deep. From then until about 2000 it closes or only weak 50 MHz. signals heard. At 2000 the evening openings commence with the usual fast QSB (flutter), sometimes making a.m. unreadable, but not so with s.s.b.

144 AND 432 MHz.

Geoff VK3YER reports that the large high pressure system over southern Australia during April resulted in some good openings on both bands, particularly to VK7, in fact, on the 19th April the VK7 2 metre beacon was audible all day around S7. Of interest was a 2 metre five-way QSO on 26th March with widely separated stations, VK3ANP (Wangaratta), VK3AKR (Mt. Waverley), VK3AMH (Ballarat), VK3AMK (Frankston) and VK2ZEO (Deniliquin). All were s.s.b. except for VK2ZEO. Peter notes also that Ian VK3ALZ is building a new quad-yagi, 33 feet long, and which would be even longer if he had a larger backyard!

V.H.F. CONTESTS

Once well supported, today they are losing their appeal. Some people in responsible circles are becoming worried at this state of affairs, one in particular being Peter VK4PJ, Federal Contest Manager. Peter has written to me seeking information as to what is wrong at present. I will outline a few thoughts on the matter and would be pleased to have constructive criticism at what I say, or what Peter has said, or anyone else for that matter, but let's get the discussion going.

Ross Hull Contest.—Some former keen participants say it is now too easy with a seven-day and 48-hour periods for scoring. They thought it was better when the Contest ran for a month and the total score for that period decided the winner. Okay if you had a month's holiday at the time, and could get around the XYL for that period to allow you to operate. Plenty of people don't have holidays at Christmas, often a few days off or at the most a week or so. Therefore the 7-day period should suit them. And for a superhuman effort, 48 hours continuous operation is not impossible. Whichever way you have it, not all will be satisfied.

Channel 0 has been blamed for lack of operation in at least two centres, Brisbane and Melbourne. No doubt it has spoilt things for a lot of people, but more and more are getting back on the band in various ways from those areas as times and techniques progress. Give a good opening to VK5 from VK3 and there will be plenty of stations to work. Melbourne boys can readily supplement their scores by the large amount of 144 MHz. activity to be found there, plus working into VK7. Brisbane boys seem to be lacking here, very few reports come to hand of any concerted activity on 2 metres. Granted Victoria's population density and short distances help a lot, but it shows what can be done.

In some areas there are problems peculiar to the geographical location. My own is a case in point. Very, very noisy 11 kv. power lines next to the antenna on a hot summer's day will put S9 plus power leak on all bands from broadcast to 144 MHz.—so I close down. These are often the days of greatest DX activity. I know others suffer in much the same way. And going in the opposite direction, have some stations a considerable advantage due to geographic isolation? If some restrictions were placed on 6 metre scoring would these operators be penalised through having no alternative operation such as 144 MHz.? Lots of questions such as these remain to be answered.

Notwithstanding all the above, the crux of the problem is not the level of participation, which generally appears to be good, but the distinct lack of interest when it comes to sending in the log. I personally believe the time allowed for logs to be sent in from the last Ross Hull Contest as too short. Those stations which amassed a large number of contacts would welcome a rest away from log entries for a while. If all contests were standardised to the extent that if a contest finished say on 15th January, then log entries would need to be posted not later than 15th February, something easy to remember, and giving a little more than a month in which to complete the job. Human failings being what they are, there will be those who miss the date through their own fault. Let's hear from those of you who are interested.

Remembrance Day Contest.—Main problem here of course is that there is really no incentive unless you live in an area of high population (Amateur-wise) density. You could almost burst your lungs out and get a contact with a couple of operators in Melbourne (from Adelaide) on 144 MHz. and what value would it be, 1 point per contact!! In the same time one could work 8 or 10 stations in Melbourne on 40 metres for one point per contact, and with a few other States thrown in for good measure with more points still. Most contest operators like a sporting chance of chalking up a fair score if he is prepared to spend quite a few hours at it, but he soon becomes discouraged when no matter what the effort, the score is still 1 point. Some incentive scoring for v.h.f. is needed, with bonuses for extra bands worked. What ideas have you on this one?

John Moyle National Field Day.—It's almost the same with this Contest, the v.h.f. operator working on 52 MHz. and up does not stand much chance—I know, I've tried it on many occasions. Best time I have had was last Contest when VK5AWI set up a large multi-operator station and all bands were available from 160 metres to 144 MHz. The v.h.f. station included in that set-up did well, but they really worked hard for their scores, whereas it was a pushover for h.f. operators. Portable to portable on v.h.f. is still only worth the same as portable to portable on h.f. Your thoughts again please.

That should be enough on the subject of v.h.f. participation in contests for this time, otherwise the Editor will be getting out his blue pencil; hope this doesn't occur as the Federal Contest Manager and I feel this is a matter which needs airing in the V.h.f. Notes, where it is likely to be read by the more interested.

That's all for this time. Closing with the thought for the month: "We don't mind youth having its fling. But we do object to some of the things they're throwing." 73, Eric VK5LP. The Voice in the Hills.

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

TEN METRE CONVERTER WANTED

Editor "A.R.," Dear Sir,

I was wondering if a ten metre converter could be described in "A.R."—a simple xtal locked unit with 7 to 9 MHz. output. I have tried to get one ready built, have had an ad. in "A.R." also over W.I.A. broadcast, but no luck. Even had chaps ring me to find out if I had any luck. I tried to get one from stores in ZL. Same answer, "Sorry we cannot supply". Have enquired from N.Z.A.R.T., no go.

If they are that hard to come by perhaps the circuit of a good one either solid state or valve would be very helpful. It's only an idea, maybe one of the VK3 members could design one for an item in "Amateur Radio".

Hope my letter may be of interest to you.

—I. Bailue, VK2TN.

[Can anyone help VK2TN—preferably with an article for "A.R."—Ed.]

"ATTENUATION MARKER"

Editor "A.R.," Dear Sir,

The "Attenuation Marker" described in the April issue of "A.R." appears to have strong possibilities and I believe every Ham shack should have one or maybe two.

Would you please advise whether the VK3 Division will be putting up a kit for the marker, especially for v.h.f. operation, as I am of the opinion that the markers would be useful at gigglehurts frequencies. It is suggested an opportune time for release of the kits would be April 1, 1973.

Permission to publish this letter is granted.

—S. G. Svensen, VK2CAS.

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"20 YEARS AGO"

The Editorial page of the June 1952 issue of "Amateur Radio" dispensed much timeless advice. To quote a few paragraphs from it would be very worthwhile. "To obtain that coveted A.O.C.P. study is necessary, whether be it at home, one of the Institute's Divisional Classes, a local Radio Club, or a Commercial College. Self discipline is a must if you expect to be successful". Note that only the A.O.C.P. was mentioned because the Limited Certificate had yet to come. "Create a habit of study. Piecemeal attempts at study may eventually get you your ticket—but you may be too old to enjoy being a Ham for long". That's worth thinking about.

Leading the technical articles was an article by Hans Albrecht, VK3AHH, "How to Use Dry Rectifiers". The use of selenium or copper oxide rectifiers was almost unknown amongst Australian Amateurs, although several well respected pieces of disposals gear used them. Who could ever forget the type 3 Mark 2. The circuits that Hans presented in his article look very familiar. The voltage doubler, the bridge, plus the full-wave and half-wave; identical in appearance to our modern power supplies using silicon diodes. Hans Albrecht was a prolific writer of articles for "A.R." during the early 1950's.

Ken Wall and John Jarman continued part eight of "Television Made Easy" with a run down on t.v.i.; something we were going to learn about just a few short years later.

That famous poor man's antenna, the G8PO, rated a short article. It seemed that no one could agree on the best method to feed these things, no doubt they could have made good use of an s.w.r. meter of the type we find so useful nowadays.

Field days were not popular in 1952. The Contest Committee reported only 12 entries and stated that they considered it hardly worth continuing the Contest; winners were VK2ASW, VK4HR and VK4KS.

"Fifty Megacycles and Above" reported a new record on the 288 MHz. band; VKs 5MT, 5KC and 5RO used mod. oscs. and super regens. to cover 106 miles.

A report on the 1952 Federal Convention included a photo of the delegates at work; looking rather younger than the last time I saw them—Max VK3ZS, George VK3XJ, Charlie VK3AUP, Arthur VK4FE, Bob VK7OM and George VK3AG. Little mention was made of business discussed, but one of the visitors to that Convention sounds familiar: Arie Bles, PK4DA, of Sumatra, who was on his way to the U.S.A.

—VK3OM.

DX

Contributing Editor: DON GRANTLEY,
P.O. Box 222, Penrith, N.S.W., 2750.
Times: G.M.T.

My apologies for the absence of notes in the last issue. I was travelling around the State in the course of my job at the time and just could not make the deadline.

Many thanks to those who have written in this month, particularly Hank VK2BHL and Geoff VK2AHK, who have taken a lot of trouble to send information which is of great interest and value to anybody trying to compile a page of this nature.

There is evidently plenty of good DX to be found, I have not been active for quite a while due to other commitments, but if the list of calls worked by VK2BHL is anything to go by, then there is little excuse for empty logs. Some of the stations worked together with QSL information, are listed as follows: 1C8TRA, FG7TD, 9Y4VV, VP2MZ (C/o. Bethel P.O., Monserrat), LX1BR, KP4DOK (Box 568, F.P.O., New York, 09555), 3A0FY/M (via F9UW), OD5CS (W3HNK), PZ1CI (Box 395, Paramaibo, Surinan), 3A2EE (F0DH), JW1EE (W2GHK), TT8AC (W4SPX), and many more. Although I don't compile the complete lists which are sent for my use, they are used to assist other sources, who in turn assist me with up to date information.

Geoff VK2AHK has been quite busy on all bands and I note the following on 10 metres, which I believe has been doing some strange things in the latter weeks of March. SV0WOO, 9J2HI, 5Z4NH, ZS5FE, ZS2AG and TG4SR were worked on this band, while VU2, ZE8, 6D4, 7Q7, ZS6, ZS3HT (QSL to WB2NQR), CR6, ZS2, A2CAB (QSL to W2RHK), 9J2 were worked on 15 metres. His list on 20 metres shows that there are plenty of good pickings to be had on this reliable band, even if it is being riddled by commercials. GC2, BV2, CT2, ZB2CG (via G3LQP), HC4CC (Box 32, Manta, Ecuador) (hope you get a card from him Geoff, I've been chasing HC for 20 years and have not scored a card as yet—Don), C31FA (QSL to G3VUI), FM7WR (Box 444, Fort de France), plus W9IGW/CE0 on San Felix.

The last mentioned station was part of an operation lasting four days over the first week of April, they operated on all bands, finally going QRT on April 14 after a very good period of operation. All QSLs should go to K3RLY.

The prefix block A3A to A3Z was allocated to the Kingdom of Tonga by the I.T.U., and the appearance of the new call signs caused something of a flutter as they hit the air. Most of us are becoming immune to these weird prefixes, but our friends the American gentlemen still go berserk when something different appears in the prefix, or should I say those of them that are desperate for something new appear in the most devastating dogpile that one could be excused for thinking that Clipperton Island had been activated. Anyway, the Tongan boys have now settled down to a more mundane period of operating, and with the initial pressure off, then maybe some of the regular DX chaps can get a go. Bill VR5FX was one of the early ones to appear with the new call, and is still doing fine business and keeping manager George ZL2AFZ busy. A35LT is quite active, his QSLs go to VK6WT.

There have been quite a large number of special prefixes on the air during April. Here are some with details included where possible. FL0QQ, no details, but QSL to F2QQ. HD1RF, manager is WA8TDY, or you may QSL direct to him, R. Farrow, Box 15, Quito, Ecuador. USSR50 is the net control for operations relating to their commemorations between Feb. and the end of June. He is on every Wednesday at 0845z.

Several 9H3 calls appeared in the first two weeks of April, Joe 9H3RUM being QRV from the Royal University of Malta, whilst 9H3D was a special operation by SM7DNL, cards for this one should go to SM7DXX. JT0AE is a new prefix, and this chap, whose manager is OK1AQW, hopes to be on 160 in June.

WG2SFC and WP6JPL were busy from the Goddard space centre during the Apollo 16 mission, which has just concluded.

Last prefix of interest is DX0PAR, the PARA commemorative station, cards for which should go to the DU QSL Bureau.

Some news from Swan Is., to the effect that Dave KS4BY is QRV, as is Leo KS4BH whose manager is K3RLY; however, KS4BA who gave his manager as WA2AAJ is a pirate, and the quoted manager has never heard of him.

Of interest is a station signing UPOL-19, he is a floating ice station and it is suggested that his cards go to UW3HY. His c.w. frequency is 14020, whilst he can be found on 14209 s.s.b., often at around 0700z.

Currently George and his wife Eva, WA2BAV and WB2AQC, are travelling through West Africa on a DX-pedition which will just be completed as I write these notes. They had hoped to operate from many countries on the African continent, and it would be wise to QSL to their home address.

More from the Apollo 16 mission. WB4ICJ is the Kennedy space station, if you worked them, send 50c for a special certificate. WG3SFC QSLs via WA3NAN; WC4BCC goes to K4REL, and WM3ARW goes to WA3ATP. Another special station from U.S.A. was WJ4AZF active at the Norfolk Azalea festival during the last week of April. W4OPM will handle the cards, and asks for IRC.

YJ8BL is usually about during the Pandoras Box net, 14278, however he has a sked with manager W6NJU on 14240 s.s.b. on Sundays at 0600z, he asks that the breakers contain themselves until after the sked ends—maybe this is too much for some.

A number of silent keys are reported in Geoff Watts DX news sheet over the past few weeks. G2TP, Clifford Andrews, 9th April; W8BAH, Harry Tummonds, Founder and Secretary of Amateur Radio Editors Association. Finally, VP9AX, Reggie Pitman, died as the result of a heart attack on March 22.

From VP9 we note VE0NK/VP9 is Brian VE1DV and asks for his cards to go to that station's QTH. Many VP9 stations are reported active 14110, 14200-225 s.s.b. on Sundays 1400-1600. There is a very good award for working 100 VP9 stations with no time limit, no date limit—and wonder of wonders—no charge. Apply to Awards Manager, Box 275, Hamilton.

FW0AB is reported on most nights at around 14250 on s.s.b., also down on 7080 s.s.b. at about 0800z. His manager is VE6TP.

Jerry 9L1JT is active on all bands, address for his cards is Box 1111, Freetown, Mike 9L1MF on 14200 at 1800z, his address is Box 376, Freetown, whilst 9L1VW has been heard on 15 and 10, manager is W9FIU.

AWARDS

In the interest of space I will abbreviate these as much as possible.

Ten O Award.—Issued by the J.A.R.L., Box 88, Ueda City, Nagano, Japan, 386.

JY Award.—Silver Award 5 stations, prefixes 1 to 9, and the gold award 10 stations on three bands. Full details later.

1971 W.A.E. RESULTS

C.w. section won for Europe by DJ8SW, and non-Europe by W1BPW; s.s.b. Europe DL4LK, and the remainder of the world by JY8BI. The Oceanic continent winner on phone was VK2APK.

160 METRE NEWS

It would appear that there is a lot of activity on this band. I have just read Stew Perry W1BB's bulletin which deals with top band only. I am amazed that there is so much activity in VK. At this QTH it is virtually impossible to hear much at this frequency due to local QRM. W1BB would like to hear from you; QTH Stew Perry, 36 Pleasant St., Winthrop, Mass., 02152, U.S.A., will find him.

At this point I guess the Editor is starting to hunt for space, so my thanks to all who have assisted, including those named in the text, my thanks to Albert Cash, Chuck Ferguson, Bernard Hughes of ISWL London, and their magazine "Monitor", and Geoff Watts DX news sheet. 73, de Don.

CONTESTS

June 10/11—R.S.G.B. Summer 1.8 MHz.
July 15/16—HK DX Contest.

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AUST. VHF/UHF RECORDS

APRIL 1972

MHz.		Date	Miles
50/52	VK3ALZ to XE1FU	1/5/59	8418
144	VK5BC to ZL2HP	23/12/65	1957
432	AX5ZKR to AX7ZRO/7	15/3/70	482
576	VK5ZJL/5 to VK5QZ/5	28/12/69	195
1296	VK3AKC to VK7ZAH	17/2/71	273
2300	VK3XA to VK3ANW	18/2/50	9.0
3300	VK3ZGT/VK3ZGK/3 to VK3ZDQ/3	14/12/63	63
10000	VK5CU/5 to VK5ZMW/5	30/12/71	59.5

—D. H. Rankin, Federal Executive.

IONOSPHERIC PREDICTIONS FOR JUNE 1972

Here are the Predictions for June from charts supplied by the I.P.S.D. The charts compare similarly as for May, however, the M.U.F. is slightly lower, thus further reducing activity in the 28 MHz. band. 27 MHz. propagation is possible for the approximate times for May, at 28 MHz., and could prove of interest in this sparsely populated section of the spectrum, especially in VK areas.

SR and LR are short and long routes respectively.

27 MHz.—

VK1—JA	minus 2	1500	plus 2
VK3—JA	minus 2	1500	plus 2

21 MHz.—

VK1—8P (SR)	minus 1	0800	plus 8
8P (LR)	minus 1	0900	plus 5
VE1 (SR)		1200	
VE1 (LR)		1000	
W6		0700-1600	
VK0 (M)	minus 3	1200	plus 4
9G1 (SR)	minus 1	1700	plus 1
9G1 (LR)		700, 1700	
ZS6	minus 2	1700	plus 2
G (SR)		1800	
G (LR)		0800	plus 1
VK3—UA3	minus 5	1800	plus 1
VK0 (M)		1000-1500	
VK4(T)—KH6		0700-2100	
VK5—KH6		0700-1700	

14 MHz.—

VK1—8P (SR)		0600-2030	
8P (LR)		0400-1300	
VE1 (SR)	minus 2	1400	plus 2
	minus 2	2300	plus 3
VE1 (LR)	minus 2	1100	plus 5
		1900	
W6		1130-0430	
PY1	minus 1	0800	plus 4
VK0 (M)	minus 1	1800-	
		1800	plus 1
VK6		0900-1830	
9G1 (SR)		0900-1300	
		1500-1900	
9G1 (LR)	minus 5	1600	plus 4
ZS6	minus 4	1800	plus 3
G (SR)	minus 2	0900	plus 3
G (LR)		0700-1900	
VK3—VK8		0800-1830	
UA3		2000-1200	
VK0 (M)	minus 5	1300	plus 5
VK4(T)—KH6		1400-0200	
VK5—KH6		1200-0700	
VK6—W1	minus 2	2200	plus 3

7 MHz.—

VK1—8P (SR)		1500-2100	
8P (LR)		0800	
VE1 (SR)		1600-2100	
VE1 (LR)		0900	
W6		1600-2400	
PY1		0600	plus 2
		1500-2000	
VK0 (M)		1600-0800	
VK6		1700-1100	
9G1 (SR)		0300-0900	
9G1 (LR)		1600	
ZS6		2400-0900	
G (SR)	minus 1	0600	plus 1
G (LR)		1530	
VK3—VK8		1800-0900	
UA3		0200-0800	
VK0 (M)		1500-0900	
VK4(T)—KH6		1700-0300	
VK5—KH6		1700-0300	
VK6—W1		1900	plus 1

3.5 MHz.—

Reduce 7 MHz. by one hour.

* * *

Smoothed Monthly Sunspot Number Predictions for June: 51, July 49, August 47, Sept. 45. —Swiss Fed. Observ., Zurich.

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KEY SECTION

The members of the section at 1st May were:

VK2GS	VK3NR	VK4DP
VK2YB	VK3TX	VK5FM
VK2ANY	VK3XB	VK5NO
VK2BPN	VK3ZM	VK6WT
VK2BRK	VK3AJY	VK7LJ
VK3KX		VK7OM

There are also four applications from VK4 still being processed.

A lot of well known call signs are missing from our list—what about it fellas? We cannot invite DX to try and work a group with only 20-odd members. 73, Deane VK3TX.

SILENT KEY

It is with deep regret that we record the passing of—

VK2APN—H. C. St. John.

DIVISIONAL NOTES

VICTORIA

The Eastern Zone at their A.G.M. on 19th March voted office bearers for 1972-73 as: President, VK3ADB; Vice-President, VK3YGJ; Secretary/Treasurer (temp.), VK3ZNC; Publicity Officer, VK3BBB; W.I.C.E.N. Co-ord., VK3ZX; Zone Station Officer, VK3DY; Zone Councillor VK3UG.

SOUTH AUSTRALIA

The Swap and Shop was quite well attended last April, with many dropping in to see how it was going. How about bringing some gear along to the next in September? Put all those old projects aside for sale to brighten someone's spring.

The South Eastern Radio Group Convention at Mt. Gambier on the Queen's Birthday long week-end this June promises to be the best ever, with most of the usual attractions and a few foxy surprises. If you haven't booked accommodation yet, you had better be well equipped with a warm sleeping bag, since those frosty mornings are hard to take. The rumour that one fox will be hidden under the ice on the Mutton Chop lake must surely be false! 73, Bart VK5GZ.

NEW CALL SIGNS

FEBRUARY, 1972

VK1BD—T. W. Stewart, 50 Caley Cres., Narrabundah, 2604.
VK1RY—R. G. Henderson, 53 Hannaford St., Page, 2614.
VK1ZKI—R. J. Langdon, 4 Rowsell Pl., Weston, 2611.
VK2EE—C. E. Frederickson, 73 Gray St., Kogarah, 2217.
VK2HE—D. Gosben, 43 The Avenue, Newport, 2106.
VK2YC—C. G. Woolston, 21 Eulabah Ave., Earlwood, 2006.
VK2ZX—J. Mowatt, 8/31 Cornelia St., Punchbowl, 2196.
VK2AUY—A. C. Russell, Station: 55 Planthurst Rd., Carlton, 2218; Postal Box 1225, G.P.O., Sydney, 2001.
VK2BBV—L. R. Burston, 4 Hillside Cres., Glenbrook, 2773.
VK2BEP—E. J. Papesch, Blowhole Park, Kiama, 2533.
VK2BGD—K. A. Wallis, 54 Combined St., Wingham, 2429.
VK2BMG—A. E. Mathews, 162 Victoria St., East Maitland, 2323.
VK2BML—M. K. Morris, 69 Rous St., East Maitland, 2323.
VK2BVL—A. J. Wright, 211 Dalton St., Orange, 2800.
VK2BVT—G. E. Ulm, 23 Elizabeth Bay Rd., Sydney, 2000.
VK2ZJO—P. A. Jackson, 8 Eden Ave., Turramurra, 2074.
VK2ZKA—A. J. Smith, 151/3 Slattery Pl., Eastlakes, 2018.
VK2ZOU—W. E. G. Cockburn, Rm. C270, S.M.H.E.A. Camp, Talbingo, 2697.
VK2ZOV—E. Gauja, 58 Centenary Rd., Merrylands, 2160.
VK3EB—J. E. Falkner, 17 Burgess St., Hawthorn, 3122.
VK3AOW—M. S. Hodgson, "Pine Ridge," Sheffield St., Montrose, 3765.
VK3BGH—J. W. Williamson, 30 Latona Ave., Knoxfield, 3180.
VK3BSH—Swan Hill District Radio Club, Drill Hall, Gray St., Swan Hill, 3585.
VK3BSM—Mildura District Scout Radio Club, Sunrasia Area Training Centre, Mildura Airport, 3500.
VK3WIA/R5—Wireless Institute of Australia, 7 Suffolk Cres., Mt. Martha, 3934.
VK3ZER/T—E. J. Roache, Watson St., Murchison, 3610.
VK3ZPL—L. G. Offer, R.A.A.F. Base, Laverton, 3027.
VK3ZVG—R. G. Farnsworth, Block 606, Cardross, 3496.
VK4ZKE—K. C. Dalton, 68 Buller St., Everton Park, 4053.
VK5EX—H. A. Fisher, 113 Seventeenth Ave., Renmark, 5341.
VK5VI—B. T. Roberts, 75 Sampson Tce., Mitchell Park, 5043.
VK5ZJV—J. W. Ross, 3 Pellew St., Parafield Gardens, 5107.
VK5ZME—A. E. Morgan, 237 Peachy Rd., Smithfield Plains, 5114.
VK6AM—J. A. Moran (Sgt.), Sgts. Mess, R.A.A.F. Base, Pearce, 6085.
VK6DV—C. J. Dodd, 3 Liege St., Woodlands, 6018.
VK6ZHJ—H. W. S. James, 27 Strome Rd., Applecross, 6153.
VK6ZJC—R. J. Campbell, 99 Dundas Rd., Inglewood, 6052.
VK6ZJR—P. J. Ryan, Station: Brown's Range, Carnarvon; Postal: P.O. Box 98, Carnarvon, 6701.
VK7CIC—W. E. Dixon, 112 Nelson Rd., Sandy Bay, 7005.
VK8DP—D. H. Pelham, 32 Memorial Dr., Alice Springs, 5750.
VK9AM—J. Glenn, P.O. Box 6177, Boroko, P.
VK9ZMN—P. McNab, P.O. Box 2086, Konedobu, P.

LICENSED AMATEURS IN VK

FEBRUARY 1972

	Full	Lim.	Total
VK0	14	2	16
VK1	92	28	120
VK2	1383	527	1910
VK3	1326	676	2002
VK4	526	211	737
VK5	516	217	733
VK6	363	141	504
VK7	154	65	219
VK8	35	12	47
VK9	88	14	102
	4497	1893	6390 Grand Total

HAMADS

- A free service for individual members.
- Four lines of print free (200 characters/spaces); full charge at $6 (min.) per col. inch if exceeded or for repeats: includes name/address—use QTHR if correct in Call Book.
- Copy, please in typescript if possible, and signed.
- Excludes commercial-class advertising.
- Exceptions only by PRIOR arrangement.

For full details see January 1972 "A.R.." page 23.

FOR SALE

Glen Waverley, Vic.: A.W.A. Carphone MR3B, c/w Mosfet Preamp., trans. 300v. p.s.u., rock. arm. mic., ant. and co-ax., Ch's A, B, C xtals, $65 o.n.o. VK3ZU (03) 560-5136.

Brisbane, Qld.: Trio 9R59DS h.f. Receiver, 0.55-30 MHz., bandspread 80-10 mx, added voltage regulator and xtal calibrator, excellent condition, $200 o.n.o. VK4ZJA, QTHR, Ph. (072) 70-1223.

Bridgewater, S.A.: Racal RA17 3rd i.f. tuning unit, input variable 2-3 MHz., output 100 kHz., $40. BC221 frequency meter, $40. ex-late VK2DQ. VK5MO, QTHR, Ph. 39-2084.

Melbourne, Vic.: Hallicrafters HT32 240v., 100w. p.e.p., $175. Type 3 Mark 2, no mod., little use, $25. VK3AQD, 55 Park St., Moonee Ponds (Ph. 37-5814) or Box 25, Ararat.

Highett, Vic.: 18AVQ Antenna with accessory for one-man installation, $55. BC221 complete with workshop manual, $40. VK3JI, Ph. (03) 630-7975, AH (03) 93-6505.

Melbourne, Vic.: Trio JR60 Receiver, $85. VK3BFW QTHR, Ph. (03) 85-4952.

Geelong, Vic.: SR-700A Comm. Amateur Rx plus a further five bands 600 kHz. between 4-30 MHz. 18 months old, as new, $350. G. Himolij, 118 Wilson Rd., Newcomb, Geelong, Vic.

Melbourne, Vic.: Mullard 5/7 Stereo Amp. and preamp./ wideband Tuner, 14w. r.m.s. total, $31.95 o.n.o. VK3ZIP, 1/42 Creswick St., Hawthorn, 3122. Ph. (03) 81-7221.

South Oakleigh, Vic.: Mobile P/S Topaz 12 to 600-300 and —120v. at 0.45a. Suit Swan, Galaxy, etc. Also Miniwhips 80-40-20. $65 the lot. VK3AQK QTHR, Ph. (03) 57-1107.

WANTED

Melbourne, Vic.: Heavy brass Morse Key, VK3BFW, QTHR, Ph. (03) 85-4952.

Canberra, A.C.T.: FT200, FTDX-401 or similar transceiver. Also FRDX-400 or similar receiver. Please contact J. Campbell, 6 Parer St., Scullin, A.C.T., 2614. Ph. (062) 54-1546.

Mt. Waverley, Vic.: Navy model R.D.O. receiver with plug-in tuning units TN-1B, 2B, 3B and 4B/Apr1. Any condition. Prices and particulars to VK3ZY (ex VK3AKR QTHR), Ph. (03) 277-4748 a.h.

Sydney, N.S.W.: Johnson Matchbox or similar. VK2AAY, Ph. (02) 467-1962.

Box Hill South, Vic.: 14AVQ or similar trap vertical antenna. Price and details to VK3AHG, QTHR, Ph. (03) 288-2024.

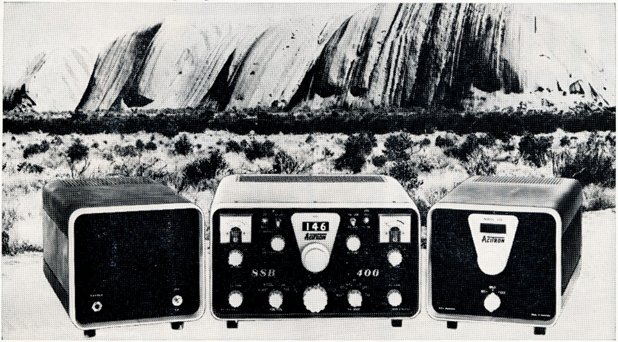
Sydney, N.S.W.: Carphone 146 f.m., ready to go on Channel B at least. Ph. (02) 871-7758 or 888-1333.

Glen Waverley, Vic.: Collins 75S1, S2, S3 or S3B. Must be mint. VK3OM, QTHR, Ph. (03) 560-9215.

Glenroy, Vic.: A.m. Tx. Prefer table-top model using Geloso v.f.o. Write/Phone Peter Simpson, VK3ZWG, Ph. (03) 306-5456.

Brisbane, Qld.: ID-11/APS-4 and ID-19/APS-3 Radar Indicator Units. VK4NS, QTHR, Ph. (072) 59-1945.

An SSB Transceiver with solid state digital readout, rapid tune-up system — and it's made in Australia.



The Acitron SSB 400 is the first HF transceiver designed and manufactured in Australia specifically for the amateur radio enthusiast.

It features a solid state digital readout of frequency accurate to ± 50Hz and a patented tune-up system which permits tuning under large signal conditions with no danger of overloading the P.A. valve.

Silicon semiconductors are used exclusively, including dual gate MOSFET, linear and digital integrated circuits. A wide band driver stage provides the input to the P.A. valve which is a dual VHF tetrode.

Construction is on epoxy-glass circuit boards with gold-plated edge connectors.

VOX and AGC are included, and an effective noise blanker is available as an optional extra. Modes of operation are USB, LSB, CW and AM (receive only). A calibrated 'S' meter and receiver gain control are provided.

Specification
Transmitter **Output** *Power:* 400 Watts pep.
Receiver Sensitivity: 0.5μV for 10dB S+n/n.
Receiver Selectivity: 2.4kHz at 6dB down, 4.2 kHz at 60dB down.
Frequency Ranges (amateur bands): 1.8–2.0 MHz; 3.5–4.0 MHz; 7.0–7.5 MHz; 14.0–14.5 MHz; 21.0–21.5 MHz; 28.0–29.0 MHz; (additional bands) 3.0–3.5 MHz; 7.5–8.0 MHz; 14.5–15.0 MHz; 21.5–22.0 MHz.
Carrier Suppression: at least 50 dB.
Unwanted Sideband Suppression: at least 50 dB.
IF and Image Suppression: at least 50 dB.
Frequency Stability: Less than 100 Hz drift in any 30 minutes (after warm up).
Antenna Impedance: 50 to 75 ohms. *Audio Output:* 3 watts into 4 ohms.
Size: 12W x 6½ H x 12½ D inches. *Weight:* 19 lbs.
Price: $800.00 excluding Sales Tax.

Also available
Transmitter Test Set: A multi purpose instrument designed with the amateur in mind. It incorporates: Aerial switching, Internal 50 ohm load with overload protection, Single and two-tone oscillators, Power meter, SWR meter. Price: $90.00 excluding Sales Tax.
AC Power Supply: Inputs: 110–240 volts, 50–60Hz. Includes a 4 ohm loudspeaker. Price: $150.00 excluding Sales Tax.
DC Power Supply: Input: 12 volts dc (nominal). An external 4 ohm loud speaker is required. Price: $105.00 excluding Sales Tax.
Remote VFO: Utilises the transceiver digital readout. Permits split frequency working. Price: $80.00 excluding Sales Tax.
IF Noise Blanker: Permits reception of weak signals under conditions of high ambient interference. It is effective with ignition noise in particular. Price: $40.00 excluding Sales Tax.
Multiband mobile aerial. Price on application.
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North Clayton, Victoria, Australia, 3168
Telephone 544 0066

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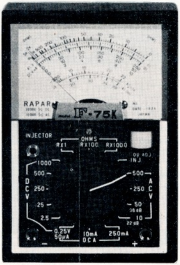
D.C. V.: 0.6, 3, 12, 60, 300, 600, 1200.
A.C. V.: 6, 30, 120, 300, 1,200.
D.C. mA.: 0.012, 0.3, 6, 60, 600, 12A.
OHMS: 1 Ω to 20 MΩ in 4 ranges.
SIZE: 7" x 5¼" x 2½".
PRICE: **$30.40** + 15% sales tax.

MODEL SK7: 4K O.P.V.

D.C. V.: 10, 50, 250, 1,000.
A.C. V.: 10, 50, 250, 500, 1,000.
D.C. mA.: 0.25, 10, 250.
OHMS: 10 Ω to 2 MΩ in 2 ranges.
SIZE: 4⅞" x 3½" x 1½".
PRICE: **$8.80** + 15% sales tax.

MODEL M303: 30K O.P.V.

D.C. V.: 0.6, 3, 12, 60, 300, 1,200.
A.C. V.: 6, 30, 120, 300, 1,200.
D.C. mA.: 0.06, 6, 60, 600.
OHMS: 2 Ω to 8 MΩ in 4 ranges.
SIZE: 5¾" x 3¾" x 2".
PRICE: **$17.50** + 15% sales tax.



MODEL TP5SN: 20K O.P.V.

D.C. V.: 0.5, 5, 50, 250, 500, 1,000.
A.C. V.: 10, 50, 250, 500, 1,000.
D.C. mA.: 5, 50, 500.
OHMS: 0.5 MΩ in 4 ranges.
PRICE: **$15.00** + 15% sales tax.

MODEL 500B: 30K O.P.V.

D.C. V.: 0.25, 1, 2.5, 10, 25, 100, 250, 500, 1,000.
A.C. V.: 2.5, 10, 25, 100, 250, 500, 1,000.
D.C. mA.: 0.05, 5, 50, 500; 12A.
OHMS: 1 Ω to 8 MΩ in 3 ranges.
PRICE: **$25.00** + 15% sales tax.

MODEL MVA5: 20K O.P.V.

D.C. V.: 5, 25, 50, 250, 500, 2,500.
A.C. V.: 10, 50, 100, 500, 1,000.
D.C. mA.: 2.5, 250.
OHMS: 1-6 MΩ in 2 ranges.
SIZE: 4½" x 3¼" x 1⅛".
PRICE: **$12.00** + 15% sales tax.

MODEL SK120: 20K O.P.V.

D.C. V.: 0.6, 3, 12, 60, 300, 1,200.
A.C. V.: 6, 30, 120, 300, 1,200.
D.C. mA.: 0.06, 6, 60, 600.
OHMS: 2 Ω to 8 MΩ in 4 ranges.
SIZE: 5¾" x 3¾" x 1¾".
PRICE: **$14.50** + 15% sales tax.

MODEL F75K: 30K O.P.V.

D.C. V.: 0.25, 2.5, 25, 250, 500, 1,000.
A.C. V.: 10, 50, 250, 500.
D.C. mA.: 0.05, 10, 250.
OHMS: 1 to 8 megohms in 3 ranges. Inbuilt Signal Injector.
PRICE: **$18.50** + 15% sales tax.

MODEL TS-60R: 1K O.P.V.

D.C. V.: 15, 150, 1,000.
A.C. V.: 15, 150, 1,000.
D.C. mA.: 1, 150.
OHMS: 1K to 100K.
SIZE: 2¼" x 1¼" x 3½".
PRICE: **$6.75** + 15% sales tax.

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